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The article on another page, written by our special correspondent, gives an interesting and comprehensive account of the mining developments in progress in the Atlin country. The author has made this season an extended trip through that country and has made good use of his opportunities for observation. Our readers who are, or expect to be, interested in that country, will be enabled to judge what work has been done, and also to form some estimate of future prospects in the region. In future issues we hope to give more of our correspondent's observations in the Atlin and White Horse districts.

While it is too early yet to say anything of the report of Mr. Frecheville, who has been sent out from London by the British stockholders to report on the Le Roi Mine at Rossland, such indications as can be obtained are favorable. It is certainly to be hoped that the mine will be worked hereafter in a business-like way and its capacities fully tested. The results of the new departure will be of interest not only to the stockholders, but to the mining industry of British Columbia generally. We have little doubt that the Le Roi will justify the confidence placed in it when it is so operated as to give the best results, and without regard to the requirements of the London Stock Exchange.

In our news columns will be found a very full account, from our local correspondent, of the strike of the Rossland miners and the present position of the Le Roi Company with relation to the movement. From the information which we have received the company seems to have a strong position, with the right on its side; and we believe that it will be successful in the end. In this connection it will be of interest to refer to the article on the "Contract System of Mining," by Mr. Carl A. Davis, which was published in the "Engineering and Mining Journal," June 29th last, and to Dr. Raymond's comments in the same issue. The continuation of the system, which Mr. Davis described, in the Rossland mines, would have avoided the present trouble and produced much better results for the miners themselves than they can now hope to obtain; especially as miners from elsewhere are now reported coming into the Rossland camp in considerable numbers.

The article on another page concludes the description of the admirable exhibit made by the Province of Ontario in the Mines Department at the Pan-American Exposition. While the three articles which we have given on this exhibit describe it as completely as possible, only those who actually saw it can fully appreciate the care and thoroughness with which it was prepared, the judgment and good taste shown in its arrangement, and the courtesy shown by the gentlemen in charge to interested visitors. We are sure that many who saw the display made at Buffalo went away with much better ideas of the resources of Ontario and the possibilities of future development in the Province than they had ever had before. The Mines Department deserves the highest credit for the exhibit.

It is to be regretted that other Provinces of the Dominion showed less interest in the Exposition, and practically left Ontario to be almost the sole representative of Canada in the Mines Building. A mineral exhibit from British Columbia, for instance, as complete as that made by Ontario, would have been of great interest and of lasting value to the Province. We do not think that the Ontario authorities will regret the exertions made by them to present their resources, both agricultural and mineral, at the Pan-American.

THE CYANIDE PLANT AT THE ATHABASCA MINE.

The latest report of General Manager E. Nelson Fell gives the following description of the cyanide plant erected at the Athabasca Mine, near Nelson, B. C.

Having by means of prolonged experiments satisfied ourselves that the process was applicable to our needs, we decided to adopt the following plan: (1) Settling tanks; (2) straight percolation, assisted by vacuum; (3) deposition on zinc shavings; (4) acid treatment for refining the product; and at the end of June we completed the designs for a plant on the above plant, of sufficient capacity to treat 35 tons daily, which is in excess of our needs at present.

The plant consists of: One stock solution tank, diameter 4 ft., stave 6 ft.; 2 solution tanks, diameter 10 ft., stave 6 ft.; 2 settling tanks, diameter 14 ft., stave 10 ft.; 5 leaching tanks, diameter 18 ft., stave 4 ft.; 2 gold solution tanks, diameter 10 ft., stave 6 ft.; 24 zinc boxes, each 1 cu. ft. capacity; 1 clean-up tank, diameter 6 ft., stave 2¼ ft.; 1 clean-up tank, diameter 4 ft., stave 6 ft.; 1 vacuum filter box; 1 Hampton zinc lathe; 1 solution pump; 1 vacuum pump.

The settling tanks are provided with automatic distributers, annular launders for overflow, and three side discharge doors each. The leaching tanks are fitted with filters and center discharge doors, and the excavation was made in such a manner that the tailings can be sluiced out through the bottoms of the tanks. The zinc boxes are square sheet iron buckets, each having a capacity of 1 cu. ft. of zinc shavings; each one is independent of the other and can be handled by an iron bail. The building is heated by steam through 3,000 ft. of 1-in. pipe and the condensed water is returned to the boiler. The pumps and lathe are worked by means of an endless single rope drive from one of the shafts in the mill; the distance covered by the rope drive is 142 ft. The building is 100 ft. long, 62 ft. wide and 73 ft. high.

It is situated immediately below the mill and the tailings pass directly into the settling tanks. Outside of the building a tank has been built of sufficient capacity to receive two days' supply of tailings in case of an accident. Work was commenced on the plant on July 1st and proved more difficult and costly than was anticipated, owing to the bad character of the ground. The work of excavation was heavy and elaborate precautions had to be taken to prevent the mill above from collapsing. In consequence of the bad ground the strength of the masonry walls had to be correspondingly increased. The principal retaining wall is 12 ft. thick, 23 ft. 6 in. high and 82 ft. long. In all 1,198 yds. of rock masonry were built, requiring 370 bbls. of cement. About 160,000 ft. of sawn lumber and 90,000 ft. of hewn timber were consumed.

PIG IRON PRODUCTION IN GERMANY.—For the month of August the output of the German blast furnaces is reported by the German Iron and Steel Union at 643,321 metric tons, which is 86,823 tons less than in August, 1900. For the eight months ending August 31st the production was: Foundry iron, 997,467 tons; forge iron, 940,631 tons; bessemer pig, 319,691 tons; thomas (basic), pig, 2,988,850 tons; total, 5,246,639 tons. For the corresponding period in 1900 the total output was 5,532,214 tons, showing a decrease of 285,575 tons, or 5.2 per cent., this year.

CANADIAN TRADE IN MINING MACHINERY.—In his latest report to the Canadian Mining Institute, Secretary B. T. A. Bell says: "Coincident with a great expansion in mineral development in Canada there has naturally been a correspondingly heavy trade in supplying mines, mills, and smelters with mining machinery and supplies, a business in which our Canadian manufacturers have more than held their own. The manufacture of many lines of high-class mining machinery has grown rapidly during the last few years, and to-day we have throughout the Dominion a number of large establishments which in point of engineering skill, equipment, and capacity to turn out good work, will compare favorably with the large works of our enterprising neighbors across the line. Naturally, we are not yet able to fill all the varied requirements of our mines and smelters, and a very large trade is done with the United States and other countries, as a reference to the following official statistics of the imports during the year ended June 30th last, will show: During this period there were imported under the free list, mining and smelting machinery of a value of $724,187, compared with $299,800 imported in 1899, $207,737 imported in 1898 and $128,780 brought in 1897. Of the free entries the United States supplied $680,250, compared with $16,380 in 1899. The distribution of this machinery was as follows in 1900: Nova Scotia, $320,038; British Columbia, $182,087; Ontario, $145,040; Quebec, $30,661; New Brunswick, $10,246; Manitoba, $1,600; Northwest Territory, $674; Yukon, $33,841. These figures, however, convey but an approximate idea of the great importance of our mining industry in its relation to the trade and commerce of the country, for we find scattered throughout the Trade and Navigation Returns numerous entries not included in the statement."

MINING IN BRITISH COLUMBIA—ATLIN MINING DISTRICT—BOULDER, PINE AND SPRUCE CREEKS—MUNRO MOUNTAIN.

By Wm. M. Brewer.

The Discovery Claim in the Atlin District is on Pine Creek, about six miles from the town of Atlin and about nine miles above the mouth of the creek. Evidently the occurrence of gold was known prior to the location of the Discovery Claim by Fritz Miller, as he had been provided with a rough map of the country and followed its guidance in his exploratory trip. Except in 1898, the year of the discovery, and in 1899, it would appear that but comparatively little exploratory work has been accomplished. The auriferous zone, so far as present knowledge goes, does not extend beyond a limited area, and no definite information can be gathered as to the conditions surrounding more remote portions of the district.

According to the geological map prepared by J. C. Gwillim, B. Sc., of the Dominion Geological Survey, there is quite an extensive area of quartzites and slates, designated as "gold bearing rocks," east of the boundaries of the limited area of magnesian rocks. Whether or not the creeks which flow through the territory covered by the quartzites and slates have been prospected thoroughly, or whether the auriferous area is confined to that laid down by Gwillim, the writer could not ascertain on reliable authority.

One fact, however, was observed by the writer during his examination of Spruce Creek, that Blue Canyon, about 13 miles above the mouth of the creek, where good pay in placer gold occurs, is beyond the boundaries of the magnesian rocks, the country rock being a dark blue or black graphite schist or slate. For this reason alone, the writer is of the opinion that a most thorough exploitation of the territory beyond the present known gold-bearing creeks is warranted, and in the general description of Spruce Creek later in this series of articles he will give further reasons for this opinion.

The writer's examination of the creeks in Atlin District began on Boulder Creek on July 18th of the present year, where he was entertained by the officers of the French company, "Societe Miniere de la Colombie Britannique," who very courteously afforded him every opportunity of inspecting the work being carried on by that company, as well as the mining being done by individual owners on the same creek above the company's camp.

Boulder Creek empties into Surprise Lake, which forms the headwaters of Pine Creek. Surprise Lake itself is about 22 miles in length,

Hydraulic Mining on Boulder Creek, Atlin, B. C.

and is fed by several creeks empting into it from both the northwest and southeast sides. Boulder is one of the longest of those which flow in from the northwest, and, from the best information the writer could obtain, is the only tributary on that side of the lake which has been a producer of placer gold. It is about four miles long, three of which have been located for placer claims.

The French company, of which Mr. Maurice Clere is manager, owns 15 hydraulic leases extending 2 miles along the creek from the mouth, besides some placer claims. The hydraulic leases comprise 2 creek leases and 13 bench leases. This company has installed a complete hydraulic plant. The water supply is taken from Boulder Creek on placer claim No. 23 below Discovery, and the ditch is half a mile in length. The pressure box is located on the mountain side at an elevation of 205 ft. above the creek bed. The flume pipe is 16 in. in diameter at the pressure box and tapers down to 10 in. at the monitor, on which either a 4 or 5-in. nozzle is used, according to requirements. A bed-rock flume is being constructed, through which flows all the material removed by the stream from the monitor. At the time of the writer's visit operations were being confined to washing a channel through a slide of moraine 50 ft. deep above rim rock on the east side of the creek. This moraine deposit apparently fills an ancient channel of the creek, covering the bed rock to an as yet undetermined depth. The present flow of the creek has cut a channel further to the east (the course of the creek is nearly south), around the base of a mound which apparently was formed by a slide from the main mountain on that side of the creek.

Operations during 1900 were concentrated in an attempt to reach bed-rock near the base of the mountain on the west side of the creek. A channel was cut through the moraine deposits for that purpose and a shaft sunk 30 ft. deep in the floor. This shaft passed through auriferous gravel which carried variable values, the bottom according to Mr. Clere yielding 60c. per cubic yard. The monitor was moved to the eastern side of the moraine deposit, its present location, as the rim rock was exposed on that side dipping to the west. Moreover, it was considered

Camp of Societe Miniere de la Colombie Britannique, Boulder Creek.

more desirable to work there at a lower level than the channel cut in 1900, in order that bed-rock should be encountered as soon as possible.

On Discovery Claim, distant about 3,600 ft. up the creek from the northern limit of the French company's ground, bed-rock was uncovered at a depth of from 3 to 4 ft., but, on the claims above Discovery as well as below, the depth increased. On claim No. 34 below Discovery Messrs. Rayl and Black, the owners of claims 32, 33 and 34 below, struck bed-rock on July 1st last at a depth of about 15 ft. The owners were sluicing at the time of the writer's visit, and had just made a clean up of 50 oz. coarse gold which they claimed represented the work of 8 men for 9 days shovelling on bed-rock. Before reaching bed-rock these men claimed that for a thickness of 8 ft. the gravel yielded wages.

Discovery Claim was staked during the autumn of 1898 by Pete Clarke. The largest pure gold nugget credited to the Atlin District was found on this claim, its weight being 48 oz. 12 dwt. This was purchased for $1,000 by M. De La Mar, the heaviest stockholder in the French company, and exhibited at the Paris Exposition.

Above Claim No. 36 below Discovery, which is the northernmost claim owned by the French company, all the claims were owned by individual owners at the time of the writer's visit, and many of the claims up the creek as high as No. 16 above Discovery were being worked by sluicing. The gold mined is quite coarse, much of the clean ups being nuggets of variable size. During the present year work was commenced on some of the claims as early as May 13th, but the frost was not out of the ground until June. From the conditions during previous years it is expected that work can be continued until about October 10th.

A geological survey of Boulder Creek, hastily made by the writer during his brief visit, caused him to form the following conclusions: That the bed-rock of the creek is composed of the same character of magnesian rock that occurs in the vicinity of Atlin, much of it being highly serpentinzed. The placer gold in the stream was apparently deposited by glacial action. So far as at present known there is no evidence of deposition from local origin, no discoveries of ledges or veins of gold-bearing rocks having been reported in the vicinity. Some of the mountain tops in the vicinity of Boulder Creek are apparently covered with the same rusty-looking rock described in a previous article by this writer, as covering so large an area of the surface in the vicinity of Atlin City, and which was thoroughly prospected by the syndicate of which Lord Ernest Hamilton was the chief stockholder. But so far as the writer could ascertain, no prospecting has been done in the mountains surrounding Boulder Creek and Surprise Lake.

Mr. Maurice Clere, the manager for the French company, has made an exhaustive study of the local conditions, with the following results: Claim No. 34 below Discovery is located in the oldest channel of Boulder Creek, and on that claim true bed-rock has been uncovered, the rim-rock being exposed on the east side of the creek in a bold bluff. From this point the course of the creek was turned considerably toward the southwest. Within recent times, this channel became filled with moraine and silt, which formed the bench that has been cut through

by the hydraulic operations, and in the channel so formed, the 30-ft. shaft was sunk which did not reach bed-rock, but exposed gold-bearing gravel near the bottom. More recently, a new channel was cut by the creek to the east of this bench, which carries no gold-bearing gravel. The ancient channel of the creek was probably 200 ft. to the west of the present channel and very deep. He found evidence on Claim No. 34 below Discovery indicating that originally the course of the creek was more westerly, and he is of opinion that it flowed back of a high bench on the west side of the present creek. On Claim No. 20 below Discovery and above that claim the rim rock dipped to the east instead of to the west, as is the case on Claim No. 34 below, and on other claims where it has been exposed between there and the mouth of the creek.

He further theorizes that the present mouth of the creek is from recent erosion, and that there is evidence of at least two ancient mouths to the creek, which formed junctions with Surprise Lake to the west of the present confluence.

In order to determine the correctness of his theories, Mr. Clere proposes to sink a shaft at a point near the lake, where he suggests one of these ancient channels occurs. If he is successful in striking pay gravel and bed-rock the ground will be worked by drifts. If the conditions have been correctly interpreted, and the writer observed indications pointing in that direction, then the bench claims on the west side of Boulder Creek will prove to be much more valuable than the present creek claims below No. 34 below Discovery, and will furnish ground which will require several years to work out.

On the southeastern side of Surprise Lake Wright Creek is the only stream on which any gold-bearing gravel has been discovered in paying quantities. As no active operations were being carried on along that creek at the time of the writer's visit to the district, he did not examine any of the claims located there. The Pendugwig Syndicate has a sawmill at the mouth of the creek, and owns a considerable tract of

Discovery, Pine Creek, Atlin, B. C.

ground under hydraulic leases which, the writer was informed, the syndicate had worked to some extent and proposed resuming operations shortly.

Otter Creek, emptying into Surprise Lake at its foot, and Birch Creek on the northerly side of Pine, were not examined by the writer. On the latter creek he was informed that the Atlin Lake Company, under the management of Mr. Mostyn Williams, had purchased all the claims from the placer miners, and would work them out by bed-rock flume and hydraulic mining.

Pine Creek.—This creek, which flows from Surprise Lake, was next visited by the writer and many of the claims cursorily examined.

From the foot of Surprise Lake the distance to the mouth of Pine Creek is about 16 miles; the course of the creek is southwesterly, and the fall from its source to Discovery Claim, about 8 miles below, as determined by the aneroid, is only about 200 ft. From Discovery Claim down to the falls, about 4 miles above the mouth, the fall is 200 ft., and the falls are 350 ft. above the level of Atlin Lake, into which Pine Creek flows. It will readily be seen that from lack of dumpage the upper portion of Pine Creek cannot be worked at all until the lower portion is worked out. Consequently no attempt has yet been made to work any claims far above Discovery Claim, and the value of the ground from the source down for about 5 miles is absolutely unknown, except through prospecting work, which has been quite limited in extent.

This portion of the creek flows through a wide valley which has every appearance of having been at one time the course of a river or an extension of Surprise Lake, and, in fact, this valley continues to Discovery Claim. A short distance above Discovery Claim Willow Gulch, itself a valley, forms a junction with Pine Creek Valley, but below Discovery Claim the creek flows between higher benches to the falls, where the waters rush over a rocky ridge through a canyon. If properly developed the creek would furnish water power equal to several hundred horse-power. Below these falls to the mouth of the creek the valley again widens out.

On the north side of the present channel of Pine Creek below Discovery there is evidence of at least two ancient creek or river beds between the creek and the foot of Munro Mountain. These are locally known as Sunrise and Tround Gulches. The surface is covered with brush and scrubby timber. Some prospecting has been done in these gulches with, as the writer was informed, variable results. Possibly a considerable acreage of these ancient beds may pay if worked by hydraulic mining on a large scale.

Pine Creek and its tributaries belong to the same geological formation as surrounds the town of Atlin, viz.: Magnesian rocks with serpentine predominating. Bed-rock in the creek is reached at a depth of 3 ft. or more, the average being probably about 10 ft. along that portion of the creek which has been worked. Practically all the work along the creek has been confined to about 3 miles, and for most of this distance more mining has been done on the benches than in the bed of the creek. Several wing dams and Chinese pumps have been constructed along the creek by placer miners to facilitate their operations. The gold recovered from both the bench and creek claims is quite coarse, much of it being in the form of nuggets. From partial clean-ups made during the writer's visit there is evidence that there is still left quite rich ground on Willow Gulch as well as on Pine Creek, but, of course, during a cursory examination no estimate of yield per cubic yard could be made.

The problem to be solved on this creek is how to work it and its tributaries profitably and avoid law suits. It is a serious question whether under the present conditions, where individual owners and two corporations are endeavoring to work on Pine Creek and Willow Gulch at the same time, satisfactory results to all concerned can be attained. The individual owners work with ordinary sluice boxes, using water without pressure purchased from the owners of ditches, while the corporations are working by hydraulic method, depositing the tailings in the bed of the creek to the detriment of the ordinary placer miner, who is quick to resent such interference. The management of the hydraulic companies argue that because of the depth of the bed-rock, insufficient dumpage facilities and scarcity of water, the ground should not be considered as placer, but should be leased by the Government for hydraulic mining. Even were this done, if more than one company engaged in bed-rock fluming and hydraulic mining the question of dumpage would still prove a serious obstacle, because operations carried on by a company working the lower creek would interfere with any workings on the upper portion, and vice versa. Consequently, it appears that the only solution of the problem will be the organization of one strong company to operate the entire creek.

At present the Atlin & Willow Creek Company and the Sunrise Company are both attempting to hydraulic. The former is constructing a bed-rock flume to work out the ground on Willow Gulch. This flume, at the time of the writer's visit, was 1,000 ft. in length. The latter company was working on Discovery Claim on Pine Creek some little distance below the point of discharge from the bed-rock flume. The Sunrise Company had not commenced the construction of a bed-rock flume at that time.

The water supply used by these companies is obtained from three ditches. The Atlin & Willow Gulch Company use from 1,200 to 1,500 miner's inches through a ditch from Pine Creek, and about 150 miner's inches through a ditch from a lake situated to the north of the gulch, but this last-named supply is only available during a portion of the season. The Sunrise Company have constructed a ditch from Pine Creek, the point of diversion being near the foot of Surprise Lake.

The bed-rock on Willow Gulch is in some places as shallow as 3 ft., and in others as deep as 20 ft., but owing to the lack of dumpage and water the bed-rock has not been exposed over a large portion of the gulch; in fact, all above the ground worked by the Atlin & Willow Creek Company. Apparently in this ground the bed-rock is quite deep. Work was commenced on Willow Gulch on May 1st of the present year, and unless stopped by litigation will probably be continued until about the middle of October.

An interesting feature in connection with the workings on Pine Creek is the uncovering on the south side near Discovery Claim of a quartz vein apparently having its line of strike nearly parallel with the channel of the creek. The quartz in this vein resembles that found on the Anaconda Claim adjoining the Atlin town site. It has the same brilliant coloring, due to infiltration of solutions. No assays had been made of this quartz, and as only a small section of the vein was exposed when examined the general dip and extent could not be ascertained.

A short distance up the creek from this occurrence of quartz is located a shallow shaft sunk on a mineral claim, which, by reason of the several claimants and resulting lawsuits, has already gained an unenviable notoriety. This is known as the Yellow Jacket Claim.

Yellow Jacket Mineral Claim.—The line of strike of the Yellow Jacket vein is by compass nearly east. The dip is at a low angle toward the south, while the country rock, so far as can be judged from the few exposures, dips toward the north. The vein appears to cross Pine Creek, and in places is about 3 ft. 6 in. thick. About 18 in. of this quartz is richer than the remainder, and particles of native gold are often visible without the aid of a lens. The quartz vein filler is very similar to that found on the Anaconda group adjoining the town of Atlin. It is very rusty from iron stain, and much of it shows the brilliant coloring noticeable in the ore at the Anaconda. The country rock which forms the walls is very similar to the magnesian rock characteristic of the vicinity. The vein has been opened by a shaft 40 ft. deep (now full of water), a cross-cut tunnel 34 ft. long and a drift about 14 ft. long.

The Yellow Jacket Claim was bonded by the Nimrod Syndicate, but the bond was allowed to expire because of the litigation pending over title, consequently no work was being done at time of the writer's visit, and no reliable estimate of the possible value of the property could be formed.

The formation on the opposite side of the creek from the Yellow Jacket shaft and about 250 ft. above has a very rusty appearance. It is filled with veinlets of quartz, and above the level of the creek bed is much decomposed. Another mineral claim has been located on this discovery, and a short prospecting tunnel driven, but this does not expose any conditions warranting the expression of an opinion as to the possibilities.

Munro Mountain.—This mountain, which rises to an altitude of about 5,000 ft., is located about 6 miles northerly from the town of Atlin. Here

is situated the Imperial Group of mineral claims, which was bonded by the Nimrod Syndicate, and on which about $15,000 were expended in prospecting. A 5-stamp mill was erected on the property at an elevation of 2,900 ft. above sea level. Two levels were opened on the vein by tunnelling, the first at an elevation of 3,200 ft., the second at an elevation of 3,100 ft. The first level was started 25 ft. below the surface, where a cross-cut was run 23 ft. to the vein. This was drifted on to the west 152 ft., and to the east 13 ft. 6 in. On the second level a cross-cut was run 118 ft. to the vein. This was drifted on to the west 34 ft. and to the east 103 ft. 6 in. Two winzes were sunk, one on the first level in the west drift 21 ft. deep, the other on the second level west drift 6 ft. deep.

From these workings 372 tons of ore were milled, which yielded, according to the books of the company, a total value of $2,625.28, or an average of $7.05 per ton in gold. The following detailed account of the crushings was furnished to the writer by Mr. Bromley, the consulting engineer:

First, 60 tons No. 1 level, W. drift, yielded $392.75, or $6.54 per ton.
Second, 63 tons No. 1 level, W. drift, yielded $792.48, or $12.57 per ton.
Third, 51 tons No. 1 level, E. and W. drifts, yielded $312.17, or $6.12 per ton.
Fourth, 75 tons No. 1 level, W. drift winze, yielded $631.66, or $8.42 per ton.
Fifth, 25 tons No. 2 level, E. and W. drifts, yielded $78.52, or $3.15 per ton.
Sixth, 78 tons No. 1 level, stopes W. drift, yielded $377.91, or $4.84 per ton.
Seventh, 20 tons No. 1 level, stopes W. drift, yielded $39.39, or $1.97 per ton.

The tailings from the mill yielded by assay $2 per ton.

The indications point to this vein as being possibly an extension of the Yellow Jacket vein. The line of strike and dip approximately correspond. The thickness of the quartz on Munro Mountain varies from 8 in. to 3 ft. The walls, especially the foot wall, are well defined, but there are some breaks in the hanging wall indicating a more recent fissuring or else the breaking down of portions of the hanging wall after the main fissure had partially filled with quartz. The country rock forming the mountain has the characteristics of diabase, but the walls of the vein are much altered and slickensided. Occasionally galena occurs in the vein, but it is not present in sufficient quantity to affect the value of the ore or to warrant sorting and saving the galena for treatment.

Comparatively little prospecting has been done either on Munro Mountain or in the vicinity. After making the mill test referred to in this article, the Nimrod Syndicate threw up the bond, and the Imperial Group has remained idle since the past spring.

Spruce Creek and Stevendike Gulch.—Spruce Creek is a tributary of Pine and enters into the latter just above the falls. Between these creeks, immediately above their confluence, is situated Stevendike Gulch. This is evidently an old channel of Pine Creek on its south side, as is Willow Gulch, already described, on the north side. During the present season much activity in placer mining has been noticeable in this gulch. The work was being carried on during the writer's visit by the individual owners of placer claims with satisfactory results. This gulch eventually should offer excellent opportunity for hydraulic mining, particularly as a bed-rock flume could be constructed to dump all tailings over the falls, thereby avoiding the difficulties which have arisen on Pine Creek because of lack of adequate dumpage ground. The question of water supply for heavy operations on Stevendike Gulch may prove difficult to solve, but a cursory examination would suggest that a sufficient supply could be diverted from Spruce Creek if such could not be obtained from Pine.

Spruce Creek itself is about 10 miles long. The source is at an elevation of about 4,000 ft. above sea level, or 1,800 ft. above Atlin Lake. In traveling up this creek the precipitous banks, nearly 200 ft. high in places, form a distinctive feature for about 6 miles above its mouth, but above that point the creek flows through extensive meadows except at Blue Canyon, about 3 miles below the source of the creek.

At the time of the writer's visit many miners were at work sluicing along this creek below Discovery Claim. Not a few of them were sluicing gravel from drifts run into the benches above rim rock. Chinese pumps for draining the ground under work were noticeable on nearly every creek claim. Discovery Claim is located about 2 miles above the mouth of the creek. Above it, and between Discovery and Blue Canyon, the bed-rock is said to be too deep for the ordinary placer miner to reach, consequently but little mining has been done between these points, except where bench claims were being worked.

During the present year the Columbia Hydraulic Company has been constructing a ditch and flume, taking their water supply from Spruce Creek. This company expects to finish the ditch and flume, which will be about 2,200 ft. and have a grade of 10 ft. to the mile with a head of about 160 ft., early enough during the present season to be able to mine for one month. The company's camp is about one mile above Discovery Claim, where it is stated the benches are about 100 ft. in height and carry gold from grass roots. The writer was informed that an estimate of the pay from such ground was probably about 25c. per yard, but, of course, active operations alone will establish a reliable estimate.

Blue Canyon is the most interesting portion of the creek. The bed-rock in the canyon is only about 3 ft. deep and on the benches below the canyon it is even more shallow. Below the canyon bed-rock has not been reached in the middle of the creek, but on the north side several miners were sluicing bench claims. The water supply is obtained from a ditch over 4,000 ft. in length, which carries 600 miner's inches. The variation in the depth of bed-rock along one claim of 100 ft. in length in the canyon is 7 ft. between the east and west lines, being 9 ft. deep at west end and 2 ft. at east end. Work of constructing a bed-rock flume as well as bench mining was in progress during the writer's visit, and a few days before a nugget weighing 36½ oz. had been taken from the bench a short distance below the canyon proper. Although the canyon proper is only about 300 ft. in length, yet for nearly three quarters of a mile below the rim rock is exposed on the north side of the creek, forming high benches. Below that point the meadows already referred to occur, while above the canyon the meadows or valley land is of greater extent. The distant mountains are comparatively low and dome-shaped.

Earlier in this article the writer stated that in the description of Spruce Creek he would present reasons for the statement that the gold-bearing area apparently extended beyond the boundaries of the magnesian rocks. These he will now call attention to:

The geology at Blue Canyon shows a decided change from that on Pine or Boulder creeks. Instead of magnesian rocks and diabase dikes, the canyon has been cut through graphitic schists of a dark blue and black color. The bed-rock in the canyon is quite porous, and, in mining, it is dug up for some depth, as examination showed that much gold was held in the cleavage planes.

Innumerable lenses and veinlets of quartx also occur, conformable to the planes of schistosity. These lenses of quartz are of greater thickness below the canyon; at one point about 2,000 ft. below, a wide ledge of sugary quartz occurs from which, on the surface, good pay has been taken by the placer miners. Several mineral claims have been staked about one and a half miles above the canyon, where quartz ledges also occur. From the rusty appearance of the slate or schist, and the occurrence of so many quartz stringers and lenses, as well as the fact that so much gold is found in the cleavage planes of the bed-rock deeper than placer gold would ordinarily penetrate, it might be inferred that a portion at least of the gold mined from Spruce Creek is due to local deposition, and that if thoroughly exploited extensive bodies of the slate or schist may be found to be auriferous, which possibly will carry sufficient values to pay for working as lode mines on an extensive scale. Fuel ought to be obtained at a low price from the White Horse coalfields, a description of which is to appear in a later article.

The line of strike of this schist is N. 20° W.; the dip is almost vertical. This schist is cut by quartzose dikes, three of which are very prominent, lying nearly parallel to each other about 600 feet apart. In one of these lenses or large kidneys of quartz occur, together with some mica. From the general appearance of these dikes they might be classified as altered granite.

The writer could obtain no definite information as to the extent of the schistose country rock of the Blue Canyon District; apparently it extends for some distance down Spruce Creek, but no natural exposures of the geology could be examined, except at Blue Canyon, nearer than distant mountains.

PETROLEUM IN ONTARIO.

According to the Bureau of Mines of Ontario, there was a slight shrinkage in the output of crude petroleum in 1900 compared with the previous year, the figures being 23,381,783 imperial gallons as against 23,615,967. The total value of the substances refined from the oil was considerably larger, being $1,869,045 compared with $1,747,352. The following table gives the details:

	1899.	1900	Changes.
Illuminating oil	$1,059,485	$1,076,242	I. $16,957
Lubricating oil	189,294	232,805	I. 43,571
Benzine and naphtha	148,963	174,346	I. 25,383
Gas and fuel oils and tar	213,544	200,934	D. 12,610
Paraffin wax and candles	136,066	184,718	I. 48,652
Total	$1,747,352	$1,869,045	I. $121,693

An examination of the returns for the two years to ascertain the proportions of the various products of distillation to the total quantity of crude oil distilled shows an increase of nearly 1 per cent. in the yield of illuminating oil, and other changes as follows:

	1899. Per cent.	1900. Per cent.
Illuminating oil	49.53	50.39
Lubricating oil	8.84	8.47
Benzine and naphtha	5.90	6.25
Gas and fuel oils and tar	22.91	15.69
Paraffin wax and candles	11.85	19.66

There was a decided diminution in the quantity of gas and fuel oils as compared with 1899 and a corresponding increase in the production of paraffin wax and candles. The falling off in gas oils is explained by Mr. Charles Jenkins, of Petrolea, a recognized authority on petroleum, as due to the fact that crude oil is now largely used instead of gas oil in the making of gas. For a long time crude could not be employed to advantage for this purpose, because too much free carbon was generated in the retorts, which ultimately choked up the mains and blackened the ceilings and walls of rooms. The art of retorting has so far advanced that this difficulty has been overcome, and gas men on equal terms now prefer crude to the product of crude gas oil.

The limits of the petroleum-bearing area have not undergone much change during the year. Operations are being extended in the township of Plympton, and Bothwell keeps up its production, but as the territory is small it cannot be much increased, while Euphemia and Dawn simply maintain their output. More or less drilling goes on in the outskirts of the old Petrolea territory, but production is not much increased thereby.

The value of the natural gas produced in the Province fell from $440,904 in 1899 to $392,823 in 1900, a diminution of 10 per cent. There were in operation 175 producing wells, requiring 306 miles of pipe for delivering the gas. Eleven new wells were put down during the year, of which seven proved productive. The number of workmen employed rose from 95 in 1899 to 161 in 1900, and wages of labor from $40,149 to $43,636.

TITANIFEROUS ORES IN ONTARIO.—In a recent paper on the "Iron Ores of Ontario," Prof. W. G. Miller says that deposits of titaniferous magnetite occur throughout the Province generally. These ores are of no economic importance at the present time, although in the past material of this kind has been successfully smelted in other countries and the metal produced from it was of a high quality. Numerous deposits of ore of this kind have been found in the Province from the area bordering the Rideau Canal, in the most eastern part, to the Rainy River District in the west, and they are often of large size. As is well known, they are believed to be of a different origin from non-titaniferous ores and are classed among ore deposits of igneous origin. They are associated with basic rocks, gabbros, and are believed to represent basic secretions from molten magmas which were composed for the most part of material now making up the gabbros. The ore shades off gradually into the gabbro.

ONTARIO AT THE PAN-AMERICAN EXPOSITION.—III.

By Harriet Connor Brown.

In the two previous articles published this summer in the "Engineering and Mining Journal" regarding Ontario's mineral exhibit at the Pan-American Exposition, special attention has been called to the display of nickel, copper, iron, graphite, gold, silver, arsenic and corundum made by the Province. Beside these valuable minerals many others, which have an important bearing on the industrial development of Ontario, have a prominent place in the exhibit. Among the most noteworthy of these is the exhibit of pressed brick and terra cotta, handsomely combined to make an elaborate arch which forms an ornamental background for part of the exhibit, and serves also as one of its main entrances. Three colors of brick and terra cotta are used, ranging in hue from a creamy buff to deep red. In design, the arch harmonizes with the other massive ornamentation which encloses the exhibit. It is a contribution from the Milton Pressed Brick and Terra Cotta Company, and is a good example of the variety of material produced by this company.

Two sorts of clays are chiefly employed in the manufacture of brick in Ontario; one, blue when moist, and whitish or yellow after burning. This is known as the Erie clay. The other is brownish in the raw state, but burns red, and is called the Saugeen clay. The white bricks command a higher price than the red, and are made in large quantities in a number of places between Brockville on the east, and Lake Huron on the west. In that part of Ontario between the St. Lawrence and Ottawa, bricks are usually made from a marine clay, which overlies the boulder clay and is called Leda clay. They are always red in color. Bricks of a superior quality and adapted for special purposes, such as street paving, are also now made from the Utica, Lorraine and other Paleoozic shale deposits. The output of Ontario's products of clay—brick, tile, terra cotta and sewer pipe—is limited only by the market demands.

In building stone Ontario takes ranks with the best, exhibiting a wide variety of granite, syenite, sandstone, limestone and marble. Almost every variety of building stone is found on the north shore of Lake Superior. Immense areas of granites and gneisses of almost every known variety occur from one end of the Province to the other, and quarries at several points are operating more or less actively. Specimens of red granite from near Kingston are particularly noticeable in the exhibit. From the Rainy River District, one mile west of Ignace,

GOLD ORES OF ONTARIO, AS EXHIBITED AT BUFFALO.

on the Canadian Pacific Railway, come specimens of granite which is found there in immense quantities.

In the regions to the north of Lake Superior are large areas of syenite as fine as any in the world. The samples shown have that peculiar lustre so characteristic of Norwegian syenite and their beauty and durableness bespeak their popularity in monumental work. This is especially true of some dark-green syenite brought from quarries near Peninsula Station on the Canadian Pacific Railroad. Dressed and polished blocks or syenite, a rich pink in color and fine-grained in texture, are exhibited from near Mackenzie Station on the same railroad. The gray-green syenite from the Gananoque quarries is also worthy of high praise. This last-named stone is worked by T. J. Stewart & Company, of Hamilton, Ont.

Sandstone is of common occurrence throughout the eastern and southern portions of the Province. Numerous quarries are in operation, producing stone of a variety of shades of color—brown, gray, mottled, etc. A dressed block of Medina sandstone from the quarries in Peel County, is set up on the front veranda of the Mines Building. It is artistically carved in Romanesque style and shows a shield bearing the coat of arms of Ontario. This stone was used in the construction of the Parliament buildings in Toronto, and is extensively employed in important work of that class throughout the country. In strength and ease of working it stands in the front rank among the building stones.

Limestone is found abundantly throughout the southern peninsula and the eastern counties. There are quarries at Queenston, Meritton, Beamsville, Wolf Island, Guelph, Ottawa, Belleville, Huron County and other places. Dressed cubes of limestone from many of these localities

CANADIAN GOLD FIELDS CO., EXHIBIT OF ARSENICAL ORES AND PRODUCTS.

are shown in the exhibit. Four blocks of limestone from the Queenston quarry, in Lincoln County, form the base of the graphite column on which stands the statue of "Canada" which is such an ornamental feature of the exhibit. Limestone mined by the Canada Iron Furnace Company, for use as flux in their blast furnaces at Midland, Georgian Bay, is exhibited from Simcoe County.

The marble exhibited has, in most cases, been taken from the surface or only a few feet beneath it. The variety and quality of Canadian marble have received the favorable comment of both Canadian and American architects and decorators, but the deposits have not as yet been extensively developed. A handsome column of white-streaked black marble is exhibited by P. W. Ellis & Company, of Toronto, from the Madoc quarry in Hastings County. Marble from the Thunder Bay District, 20 miles west of Wolf River station on the Canadian Pacific Railroad, comes from a horizontal bed about 20 ft. thick, through which run strata of indurated marble of different colors. Marble from Cornwall, on the St. Lawrence River, commonly known as black marble and in high favor for interior decorative work, is partially argillaceous, but takes a high polish. A fine collection of polished cubes from Wolf Lake in the Thunder Bay District represents material said to occur in considerable quantities. Although not susceptible to high polish, they are rich in color, the tints varying from a mellow gray through deeper shades to light pink, purple, green and brown. They are well suited for mosaics, panels, mantels and other interior decorative work. Marble used for making lime in the nighest class of plastering work is exhibited from Hastings County. It dries well with a very hard finish and analysis shows that it consists of 97 per cent. of carbonate of lime and 3 per cent. of carbonate of magnesia.

Some beautiful specimens of jasper conglomerate are displayed from the Bruce Mines locality, north of St. Marie River, Algoma District. Other dressed and polished pieces of this handsome stone can be seen in the exhibit of the Lake Superior Power Company. A considerable area in the vicinity of the Bruce Mines is strewn with boulders of this material, some of which are very large. It resists the action of weather better than granite and makes a very handsome appearance when dressed. It is rock consisting of a matrix of white quartzite, in which pebbles are often found of red, yellow, green or black jasper and colored chalcedony, which contrast strikingly with the white matrix. This jasper exists in abundance for miles in the country north of the Bruce Mines. The values of the structural material and clay products for the year 1900 was nearly $4,000,000, giving employment to 6,800 operators.

Ontario is a favored field for the production of portland cement, as

it contains large beds of marl and clay near water and convenient to rail transportation. The proportionately long coast line that Ontario has on the Great Lakes from the St. Lawrence to Lake Superior gives the Province special advantage for utilizing the mineral resources of the interior and preparing them for market, advantages which are not generally appreciated.

The largest part of the cement produced in the Province at present is manufactured at Marlbank and Strathcona, the two plants having a daily capacity of 1,800 bbls. The wet method of mixing is used in both mills; in the latter works the cement is burned in Albany and Dietsch kilns, while at Marlbank the long revolving kiln is in use. Both the dry and wet method of mixing is practiced at Owen Sound; and both modes of burning, kilns are used here and at Shallow Lake. Rotary kilns are used at the works on the other side of the Sound.

There are now five establishments in Ontario which produce portland cement. In the year 1900 they employed 485 workmen at a combined

Ontario Supplemental Exhibit on Front Veranda, Mines Building.

wage of $166,143. The number of barrels produced was 306,726, worth $598,021, in the market. The average price was $1.95 a barrel as against $2 a barrel in 1899. In addition to the factories now in operation several others will place their product on the market this year. Cement mills are projected at Durham, in Grey County, and Crookston in Hastings County, at Lakefield near Peterborough, and at Orangeville, each of which will have a daily output of from 500 to 1,000 bbls. a day.

Several specimens of lithographic stone are conspicuous in the exhibit. One from the Madoc quarry in Hastings County, bears the photographs of the Hon. G. W. Ross, Premier of Ontario, and the Hon. E. J. Davis, Commissioner of Crown Lands. Another stone from Peterborough County is similarly decorated with a picture of the Hon. G. W. Ross. The most important district in which lithographic stone has been found is that including these counties of Hastings and Peterborough. A bed of compact limestone, about 2 ft. thick, at Marmora, is of impalpable grain, and affords a lithographic stone of good quality. The band to which this bed belongs crops out at intervals all the way from Hungerford to Rama townships, a distance of about 100 miles.

Some superior specimens of gypsum are seen in the exhibit. It is found in southern Ontario in rocks of the Silurian age, at points along the Grand River, near Paris, and in the vicinity of James Bay, in thick and extensive beds in the Devonian limestone along the Moose and French rivers. Gypsum or "plaster," as it is locally termed, has been produced irregularly in the vicinity of Caledonia since 1874, but at present some of the deposits on the Grand River are the only ones being worked. They produce a very satisfactory quality of plaster of paris. The only mine in the Province at present producing white gypsum is in Haldimand County. The deposit here lies at an average of 70 ft. below the surface, and is reached by an incline 270 ft. in length. The gypsum is shipped to the Alabastine Company, Paris, Ont., for grinding and calcining. The product for 1900 was a little less in bulk and a little more in value than the year before. The salt industry is represented in the exhibit by bottles of brine from which the salt is precipitated, beside bottles of the finished product in the form of fine salt, coarse salt, butter salt, extra coarse salt and cheese salt. The salt is produced by pan evaporation of brines pumped from wells drilled to the underlying salt beds of the Onondaga rocks, which are of Upper Silurian age. Some fifteen firms are operating at various points in the counties bordering the southwestern shores of Lake Huron and along the St. Clair and Detroit rivers. It was in 1876 that the existence of six beds of rock salt was first discovered there. The beds are not all alike in purity, the first being scarcely suitable for mining, while the second is remarkably pure and the third nearly as good. The two latter, which together measure over 60 ft., are separated from each other by a stratum of less than 7 ft. The total output of this district last year was 66,588 tons of salt, worth $324,477.

Rough blocks of feldspar (of the microcline variety) are placed at the north door of the Mines Building with several other large pieces of iron, nickel and zinc ores, being overflow specimens from the main Ontario mining exhibit. This feldspar, which has been shipped for some time to the pottery works in New York State, is mined near Bedford on the Kingston & Pembroke Railway, not far from Kingston. The large, pure specimens, one of which weighs about 2,000 lbs., represent the material as when shipped for use. There are two separate bodies of the feldspar separated by a narrow band of white quartz rock. The deposit which is being operated, is 150 ft. wide, and has been traced along the outcrop for 225 ft. The other deposit is 60 ft. wide for a distance of 300 ft. The output to March 1st has been 4,000 tons, most of which has been exported to Trenton, New Jersey, and points in New York State for use in the manufacture of pottery.

The most important of the Ontario minerals used in the production of light and heat is petroleum, the supply of which is centered in Lambton County, and in the Township of Zone in Kent County. The quality of oil found here is said to be superior for lubricating purposes. Six producing fields are found in Ontario's oil area. They differ much in size and importance, each one representing a separate oil pool. They are as follows:

Petrolia, containing about	7,000 wells
Oil Springs, containing about	1,600 wells
Bothwell, containing about	150 wells
Euphemia, containing about	90 wells
London Road, containing about	70 wells
Dawn, containing about	60 wells

The Petrolia oil-fields yield about 45,000 bbls. a month, and Oil Springs about 12,000 bbls. in the same period. The oil obtained in Lambton County is dark brown in color, and differs from the oils of Pennsylvania and Ohio in having a much higher percentage of sulphur. This makes it more refractory for refining, but by modern methods a refined petroleum is produced equal to the best. The production of the Canadian oil refineries for the year 1900 was as follows:

Petroleum used	23,381,783 gal.	
Illuminating oil	11,783,755 gal.	$1,076,242
Lubricating oil	1,980,428 gal.	232,805
Benzine and naphtha	1,463,599 gal.	174,346
Gas, fuel oils and tar	3,669,102 gal.	200,934
Paraffin wax and candles	4,599,683 lbs.	184,718

Petrolia was formerly the center of the oil-refining industry, which was carried on by a number of companies. These were afterward merged into two, and in the fall of 1898 they were consolidated into one company, which took the name of the Imperial Oil Company. Its headquarters are at Sarnia, but Petrolia is still the center of the crude oil production. It is gathered and tanked there from the different parts of the field, being shipped to Sarnia, 16 miles distant, through a pipe line 3 in. in diameter. Among the exhibits of the Imperial Oil Company may be mentioned crude petroleum, naphtha, gasoline, benzine, water white and prime white oils, cylinder oil, engine oil, paraffin candles and axle grease.

A small specimen of asphaltum from Simcoe County is exhibited. During the hot summer months this material oozes up through the sand and hardens after exposure to the atmosphere. No idea can be formed

Arch of Pressed Brick, Ontario Exhibit.

of the extent of the deposit, as nothing has been done in the way of development. An analysis of the pitchy substance gives:

Moisture and volatile combustible matter	66.44 per cent.
Fixed carbon	33.07 per cent.
Ash	0.49 per cent.
	100.00 per cent.

The peat of Ontario is strikingly represented in the exhibit. One side of a tall wooden case contains a section of a peat bog, representing the first 7 ft. with the fresh sphagnum moss at the surface passing through various stages of decomposition into denser material, like unformed coal, at the bottom. On the other side of the case, the different stages of treatment are illustrated by specimens of moss-paper, moss-litter and peat briquettes. Moss-litter is as yet produced only in small quantities, but peat briquettes are rapidly growing in favor as a desirable fuel.

Gas is also manufactured from this peat. The Peat Fuel Syndicate of Toronto has been investigating the uses and preparation of peat in foreign countries and is now conducting experiments which will tend to develop the industry. Throughout the entire Province there are extensive areas of this substance. To the south of James Bay, the northern boundary of Ontario, peat beds cover a large part of the region for many miles to the south and southwest, with practically no growth of trees covering them. The peat exhibit is made by the Peat Development Syndicate of Toronto, which includes the principal manufacturers in the Province.

One of the interesting exhibits is an array of glass jars containing calcium carbide, used for producing acetylene gas for illumination or for fuel. The ground limestone, and the ground coke dust which are mixed together for conversion in the electric furnace into calcium carbide are also shown. There are three works in Ontario for the production of carbide of calcium and the demand for the article steadily increases as new methods minimize the danger in the employment of acetylene gas.

Asbestos is found in Ontario in Hastings County, also along the Ottawa River, and in the Lake of the Woods region. Although the asbestos deposits of Ontario have not as yet been largely worked, a good collection of specimens is shown from Hastings County. The hornblende variety of asbestos, known as actinolite, is more common in Ontario than the serpentine or chrysotile asbestos. The exhibit contains specimens of both white and gray. Talc of the finest grade is found in the exhibit. The Ontario talc is said to equal the finest French variety. The output of the Harrison and Henderson mines, near Madoc, Hastings County, is being shipped to mills in New York State. The vein of talc in the Henderson mine averages 36 ft. wide, cutting across a dolomite formation.

Beds of steatite or soapstone varying in thickness from 1 to 16 ft. are also found in Ontario. The mining of this material has not progressed very far, though some apparently extensive deposits have been found and partially developed in Addington and Frontenac counties, and in the Lake of the Woods region. Representative specimens are included in the exhibit.

An attractive feature is the mica, which is displayed in large sheets encased and fastened against the wall. A part of this display illustrates one of the latest uses for which mica is employed, that of insulating steam pipes and boilers. Mica crumpled and packed together has proved to have great utility for this purpose. The recent decision of the British Admiralty to employ mica covers on the boilers of their new ships in preference to asbestos has already increased the prestige of the mica boiler covers from 200 to 300 per cent. The principal region in which the mineral is found includes the counties of Frontenac and Lanark in Eastern Ontario. Mica mining is carried on also in the Parry Sound District, but not with much activity.

These articles on Ontario's mineral resources should not be closed without mention being made of the fact that the Governments of both the Dominion of Canada and the Province of Ontario have by their bounties encouraged considerable investment in iron and steel plants throughout the Province. Three blast furnaces are working at present, producing in the year 1900, 62,386 tons of pig iron, valued at $936,066. The pig iron produced in 1896 amounted to only 28,302 tons, with a value of $353,780. Open-hearth steel was made in Ontario for the first time last year at the works of the Hamilton Steel and Iron Company at Hamilton, Ont., whose exhibit of railroad tie plates and angle iron, steel bars, sections of pig iron and manipulated bars has shown Canadian iron and steel to be equal to any exhibited in the Mines Building. A bessemer plant and rail rolling mill is being constructed at Sault Ste. Marie and two blast furnaces are to be erected at the same place. A company of American iron men contemplate building furnaces at Collingwood, on Georgian Bay, and have already taken the preliminary steps toward this object. The metallurgical industries at Sault Ste. Marie, Ont., where are situated the alkali works and ferro-nickel reduction works of the Lake Superior Power Company, should also be mentioned.

Excepting natural gas and a few unimportant substances, every mineral resource of the Province has been represented in Ontario's admirable exhibit. One of its most striking characteristics is the massive array of material in each division, the whole aggregating about 100 tons. Stress is laid on the economic minerals with the idea of giving a truthful and convincing impression of the abundance and variety of mineral wealth in the Province. The clear and systematic method observed in labeling the specimens is a specially commendable feature. Important developments have already been brought about through the agency of this exhibit, and we predict still further good results, as the effect of the knowledge given by the enterprise of the Ontario Government makes itself evident.

THE STEEL WORKS AT SAULT STE. MARIE.

In a paper published in the latest report of the Ontario Bureau of Mines, Mr. F. N. Speller gives the following description of the plant which the Lake Superior Power Company is erecting at Sault Ste. Marie:

The coke to be used at the Sault must be brought from either the Connellsville or Punxsutawney District. This is the most important item in the cost sheet of the locality under consideration. It means an approximate haul of 210 miles by rail from Connellsville to Lorain or Cleveland, and a water haul to the Sault equivalent to 80 miles of rail haul. As it will require 1.70 tons of coke to smelt an equal quantity of ore and produce one ton of pig iron, applying Mr. Moxham's freight rate we find that it will cost about $1.97 to bring this fuel within easy reach of good ore and limestone on the north shore of Lake Superior or at the Sault; so that it appears quite evident that the cost of assembling the necessary raw material—coke, limestone and iron ore—in the neighborhood of Sault Ste. Marie should be much less than at Pittsburg. At present the bessemer steel works and rail mills are being installed with three 8-ft. cupolas for melting the pig iron for conversion.

The pig iron will be provided by the Midland furnaces, until the large pair of blast furnaces now being designed are completed, when the direct metal process will be adopted. The bessemer plant will consist of two acid-lined converters of 5 tons capacity each. The metal, after being blown, is handled as in the best modern practice, by pouring into moulds on buggies, the ingots being stripped after standing a few minutes. The stripping is done by means of an overhead stripping crane, designed by the Wellman-Seaver Engineering Company, of Cleveland. This crane is also provided with an auxiliary trolley which is used to change the ladles on the ladle crane. The ingots are then conveyed to the pit furnaces (soaking pits) consisting of two 4-hole furnaces. The ingots are drawn and charged in these furnaces by an overhead electric drawing and charging crane, designed by above-named company, which also delivers the ingots on the blooming mill tables. They are then passed through the 32-in. blooming mill, driven by a pair of 28 by 48-in. reversing engines built by the Southwark Foundry and Machine Company, of Philadelphia, Pa. The blooms are then sheared to the proper length in proportion to the section of rail into which they are to be rolled, and next are conveyed to 4 Siemens regenerative heating furnaces.

The overhead drawing and charging crane is used in connection with these reheating furnaces for charging and drawing the blooms. This crane also delivers the bloom on rollers which run to a 23-in. rail mill driven by a 40 by 48-in. Porter-Allen engine, built by the Southwark Foundry and Machine Company. There are in this mill three stands of rolls; first and second roughing, and finishing rolls. The material is handled and manipulated at the rolls by electrically driven transfer tables, designed by the Wellman-Seaver Engineering Company. This train is covered by an overhead electric traveling crane, which is used for handling rolls and spindles when changing from one section of rail to another. After leaving the rolls the rails are run to the hot saws, where they are sawn to the required lengths. They are then passed through a cambering machine and conveyed to the hot beds, where they are permitted to cool sufficiently to be finished in the cold finishing department. Here the rails are straightened, inspected and drilled, then handled by pneumatic overhead hoists and loaded on cars under cover for shipment. The cold finishing department being all under roof, the product is carefully protected until loaded on the cars. The plant is laid out with a view to handling rails in 30 or 60-ft. lengths, up to 85 lbs. per yard, and structural materials, such an angles, channels, beams, etc.

From the above description it will be observed that, where possible, electricity is used to replace steam, owing to the cheapness of power in this form furnished from the water power plant of the Lake Superior Power Company. The material and product is handled throughout the works with the most approved modern labor-saving machinery. The engineering work of the plant has been entirely under the direction of the Wellman-Seaver Engineering Company, of Cleveland, O. The boiler plant for supplying the necessary power consists of the modern type of water tube boilers. Gaseous fuel is furnished for the soaking pits and reheating regenerative furnaces by the Talbot-Fraser gas producers.

The plant is close to the terminal of the Algoma Central Railway, which affords excellent facilities for the handling of raw and finished material, both by water and by rail. All the buildings are of the artistic design adopted in other mills of this company, and built of St. Mary's sandstone, with corrugated iron roofs supported on steel frames.

ABSTRACTS OF OFFICIAL REPORTS.

Athabasca Gold Mine, Limited, British Columbia.

The report of this company for the year 1900 contains many interesting particulars of operation. In the mine, which is located near Nelson, the development work done included 250 ft. sinking, 152 ft. raising and 1,519 ft. drifting; a total of 1,921 ft., the average cost of which was $15.10 per foot. The total ore mined and milled was 5,054 tons. The earnings and working costs for the year are shown in the following table:

	Total.	Per ton.
Bullion sold	$130,054	$25.734
Concentrates sold	40,615	8.036
Store and sundry profits	3,290	0.650
Total income	$173,959	$34.420
Mining	$104,726	$20.721
Milling	14,328	2.835
Tramming	1,138	0.225
Smelter costs, direct	5,005	0.990
Smelter costs, indirect	3,377	0.668
Plant maintenance	2,819	0.558
Management	10,243	2.027
Provincial taxes	2,240	0.443
Bullion charges	532	0.105
Total	$144,408	$28.572
Profit from working	$29,551	$5.848

The expenditures for new construction during the year amounted to $44,473. The mill worked during the year 351 days 11 hours, having been idle 13 days 17 hours, of which the regular monthly clean-ups occupied 8 days 17 hours. Since the mill commenced to run in November, 1898, it has worked a total of 765 days 17 hours out of a possible 791. During this period not a stem, head, cam or tappet was broken. An important feature is the superior percentage of recovery in the mill in 1900, as compared with 1899. In 1899 the ore yielded $19.62 per ton with tailings valued at $7.45; during 1900 the ore yield increased to $33.66, or 58 per cent., while the tailings value increased to $8.71, or only 8 per cent. The percentage of recovery in 1899 was 72.5 and during 1900 it was 79.4. This improvement is more noticeable, inasmuch as the percentage of sulphides in the ore has risen materially. In 1900 the percentage of concentrates by weight to ton of ore milled was 10.2 per cent., against 8.3 per cent. for 1899; and in value, the percentage recovered in the concentrates amounted to 25 per cent. in 1900, against 22 per cent. in 1899.

The report of General Manager E. Nelson Fell says, in part: "The vein has continued to present difficulties which have rendered the cost of mining high; it has been broken by faults, it has lain flat and its

width has been about the same as during the previous year. For every ton of ore about 4.6 tons of waste have been mined, and a further amount of waste (which I am not able to estimate), has been mined and left in the worked out stopes. Under these conditions, and, although every effort has been made to conduct the work on economical lines, the cost per ton is high. . . .

"We had anticipated early in the year that the vein would leave the schist and enter the granite at some period not far distant, and this expectation was fulfilled when our shaft (No. 2) first struck the granite in June. We had previously experienced on the schist side of the contact a remarkable concentration of values (which is shown in the returns for May and following months), and some anxiety was felt as to the condition in which the vein would be found in the granite. Any doubts on this point were quickly removed when the vein was found in a stronger body than ever before, and with a tendency to average larger than in the schist. In the new formation we experienced an entirely new series of faults and the vein was very much disturbed; this was only to be expected in the neighborhood of the contact, and we expect an improvement in this respect as our development becomes more and more removed from the schist area. In common with the character of the ground, the value of the ore and its character have been uneven, and, owing to certain local conditions, a certain amount of waste had to be sent to the mill with the ore. These facts account for the drop in the produce during the last three or four months. I regard these features as local and temporary in character, and already we are beginning to find again bodies of ore as rich as any we have had in the schist. There is now no longer any room for doubt that the vein is the same as, or is closely related to the vein in our old (No. 1) shaft, and this extension of the vein northward is an important and highly favorable feature. On the south, the vein in the schist has been cut off by a prominent fault and very little effort has been made to find the vein on the other side. This is one of the most important points for future exploration, for it can hardly be doubted that it can ultimately be found here, and as the last assay from the vein, where cut off in Intermediate No. 1 level, gave over $300 to the ton, it is worthy of some outlay on exploration.

"Regarding the future it is difficult to forecast the form which development will take, owing to the extraordinary character of the vein. We have carried on development actively during the past year, to the extent of nearly 2,000 ft.; but no comprehensive plan can yet be laid out, and we have to be guided each week by the result of the previous week's work. . . .

"This is not a mine where ore can be blocked out, ore shoots defined and the future planned with certainty. Our experience in the past is our ground for confidence in the future, and looked at in that light, I can confidently assert that the prospects of the mine have been very much benefited by the work of last year; this work has shown the existence of ore bodies, the richness of which was not before suspected; it has shown that the vein is greater in extent than formerly supposed, and that other ore chutes or pockets of similarly rich ore are scattered through the vein in both the granite and the schist. But the most important result achieved by the development of last year is that the mine is now more open than it has ever been before, and that it is possible for us to increase our output very largely. When we were mining very high grade ore this feature was not so important, as ore of that grade had to be treated with great care in the mill—now that the cyanide plant is completed we can make such changes in our mill as will enable us to treat 800 tons per month if necessary, and the fact that the mine is in a position to stand an increased output is a most important feature in considering the outlook for the coming year.

"The gravity tramway has continued to perform its functions without delays or accidents of any kind; 5,054 tons have been handled during the year at a cost of $1,138, or 22c. per ton, including current repairs and supervision. . . .

"In new construction, I have to record the completion of the compressor by the addition of the second half, the construction of the new dam and flume for improving the water supply for this machine, the erection of certain buildings for housing the men, and more especially the erection of the cyanide plant. This latter has been built on a substantial scale and will, I trust, prove a valuable addition to the company's works. The extraordinary difficulties encountered in its construction have delayed its completion far beyond the date expected, but I am able to report that it is now finished. The dam erected to store the tailings broke out on July 1st, and a certain portion, probably one-third, was lost. The dam was completely wrecked and since that date it has been impossible to save the tailings.

"Careful attention has been given to the flumes and accessories, and an air-tight cover placed on all; the result is that no mishaps have occurred and there have been no delays to the machinery from this cause. This is an important consideration, where, as in our case, we depend entirely upon water for power, and in this country, where ice is a dangerous factor.

"This company paid into the Provincial treasury the sum of $2,240. After June 30th the rate of taxation was raised from 1 to 2 per cent. on the gross output, after making certain deductions specified by law. The law was probably framed without a knowledge of the widely different conditions under which mining is carried on in this Province. Under the present system of deductions allowed, it discriminates in an unequal manner between mines which produce ore at a low cost and those like ourselves, which operate on high grade ore with a heavy mining cost. My opinion is that the question of taxation should be approached from an entirely different standpoint; that the system of royalties, which is always vexatious, should be abolished, and that an equitable system of taxation should be devised whereby all property in the Province, railroads, mines, real estate and personal property and all industries, should bear, not only an equal rate of taxation, but a rate which can readily and manifestly be demonstrated to be equal. This could only be affected by adopting sweeping reforms in the fiscal policy of the government, and in the meantime representations are being made with a view to adjusting conditions on a more satisfactory basis than at present existing. Under the heading of plant maintenance all expenses have been included in connection with general repairs, the preservation of the property, road repairs, etc. The company's property has been maintained in a thoroughly efficient condition, and many minor improvements, which might have been included in the account of new construction, have been charged to plant maintenance and income."

THE IRON ORES OF SOUTHEASTERN ONTARIO.

In an interesting paper read before the Canadian Mining Institute at its latest meeting, Prof. Willett G. Miller thus speaks of the iron ores of the southeastern section of Ontario:

The ores of economic interest are of two kinds—magnetites and hematites. The former occur largely as contact deposits, as already stated, the wall on one side being in many cases composed of crystalline limestone, while the other wall is some form of gneiss, often the scapolite-holding variety. The two districts in this part of the Province which have been developed to the greatest extent are situated along the Kingston & Pembroke, the Central Ontario and the Irondale & Bancroft railways. Along the first-mentioned road the deposits which have been worked in recent years are found at different points for a distance of about 50 miles, beginning 30 miles north of Kingston. All the deposits recently worked here are composed of magnetic iron ore. Much of this is coarse in grain and thus differs in appearance from the characteristic fine grained and slaty magnetites of the northwestern region. Outside of silicious material many of these ores are very pure, but the ore from a few deposits contains enough sulphur to lower its grade. Years ago some hematite deposits were worked in the district lying east of the Kingston & Pembroke Railway, the most important being in Lanark County.

Along the Central Ontario Railway the magnetite deposits which have attracted most attention are those of Belmont and Coe Hill, although much has been done on a number of others. The deposit which has been worked most continuously along this line of railway is, however, composed of hematite and is known as the Wallbridge Mine. Years ago this deposit was thought to have been worked out and was so described, but during the last few years it has produced a considerable amount of good ore.

One of the chief reasons for the beginning of the construction of the Irondale Railroad was the transportation of iron ore from a number of deposits known to be situated in the district traversed by it. Some of these have been worked at different times. They are all magnetites.

Although high-grade ore is obtainable from many of these deposits in southeastern Ontario, they are of smaller size than those of the Lake Superior Region and are thus to some extent handicapped. No doubt, however, now that the Province is becoming an iron producing country of importance, these deposits will be the scene of considerable activity and the ores will always be in demand for special purposes. Only recently ores have been shipped from the Kingston District to Pennsylvania to be used in the production of high grade steel.

The smaller size of the deposits is partly compensated for by the fact that they are situated in districts in which labor and supplies are cheaper than in any other mining district in the Province. Moreover, if approved methods were adopted in their handling, the output of merchantable ore could be greatly increased.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

The Tyee Copper Company, British Columbia.

Sir: My attention has been drawn to an article in the "Engineering and Mining Journal," September 21st, 1901, referring to the Tyee Mine Mount Sicker, Vancouver Island, B. C., which property is owned by the Tyee Copper Company, Limited, of London, England. I do not know who your correspondent may be, but the statement contained in your paper is not a correct one. For a long time past the Tyee Mine has been in a position to ship large quantities of copper ore to alien smelters and could have done so at a good profit. Fortunately, however, there has been no need for this, as the Tyee Company has always had ample funds for heavy development, and the directors have throughout adopted the wise policy of thoroughly proving and opening up large ore reserves rather than of "picking the eyes" of the mine before it was in a position to ship continuously. Thus our not shipping up to the present time has been purely a matter of policy, and has nothing to do with values, which are good enough to satisfy everyone connected with the mine. The sum of £25,000 has been spent in development work alone. The property has, so far, been opened up to a depth of 235 ft. and along a length of 500 ft., the ore-body being continuous throughout. We are now stoping on an ore body 30 ft. wide, of solid copper-gold ore, which averages 8 per cent. copper, 4½ dwts. gold and 4 oz. silver per ton of 2,000 lbs. A further working capital of £50,000, which is required for the transport and treatment of this ore, in a way most advantageous to my company, has been over-subscribed by men who are interested in and thoroughly know the mine.

Claremont Livingston,
Manager Tyee Copper Company.

Duncans, B. C., Oct. 4, 1901.

[The note which our correspondent refers to was contained in our London letter, published in the issue of September 21st. It was a simple statement of facts relating to the company's offer of additional capital, and was so worded as to express no opinion in the matter at all. We publish the letter above, as we do not wish to do any injustice to the company; though we do not think there was any serious cause for complaint.—Editor E. & M. J.]

PERSONAL

Mr. Arthur Drysdale has been appointed commissioner of mines for Nova Scotia.

Mr. C. S. Britton, of Cleveland, O., was at Deloro, Ont., recently in connection with mining matters.

Mr. J. E. Lyons, of Lewiston, Mont., has returned to that place after spending 4 years of residence in Dawson, N. W. T.

Mr. Harry Cockshutt, ex-mayor of Brantford, Ont., was in Rossland, B. C., last week. He is interested in Slocan mining property.

Mr. A. M. Taylor, representing the hydraulic engineering firm of C. & A. Musker, of Liverpool, Eng., is at present in Pittsburg, Pa.

Mr. Geo. T. Rives, late of Lillooet, B. C., has been in San Francisco negotiating a sale of some northern California mining properties.

Mr. B. Crowell, of the firm of Crowell & Peck, mining engineers, of Cleveland, O., is examining various mining properties in Ontario for Eastern men.

Mr. R. G. McConnell, of the Dominion Geological Survey, and his brother, Mr. G. S. McConnell, have returned to Victoria, B. C., from the North.

Sir Christopher Furness has been inspecting the works of the Dominion Iron and Steel Company at Sydney, C. B., and the collieries of the Dominion Coal Company.

Mr. W. J. Pope has been appointed professor of chemistry and head of the chemistry department at the new Municipal School of Technology at Manchester, Eng.

Mr. D. Adamson, of Joseph Adamson & Company, of Hyde, Cheshire, Eng., manufacturers of boilers and electrical traveling cranes, is now in the United States on a brief visit.

Messrs. Geo. Sutherland, W. Whittier and G. B. Trites, a party of miners, after completing the clean-up on their property on Bonanza Creek, N. W. T., arrived in Victoria, B. C., recently.

Dr. A. Stansfield, instructor in assaying under Sir W. C. Roberts-Austen, at the Royal College of Science, London, has been appointed to the newly-established chair of metallurgy in McGill University.

Mr. Oliver Wethered, chairman of the London & British Columbia Gold Fields, Limited, of London, Eng., recently visited mining properties in British Columbia in which the company is interested.

Sir Marcus Samuel, president of the Shell Transport and Trading Company of London, is at the Waldorf-Astoria, New York City. The company controls the European trade of the Guffey oil interests.

Mr. W. M. Brewer, traveling correspondent of the "Engineering and Mining Journal," was a passenger on the Canadian Pacific steamer "Hating" that went ashore on the British Columbia coast this week. Mr. Brewer escaped injury.

Mr. Marshall Jackson has returned to Rossland, B. C., from a trip to Scotland. He represented the Mother Lode property in Burnt Basin to parties in the old country and secured a considerable sum for the opening up of the proposition.

Mr. Percy A. Gough, for 9 years connected with the Carnegie Steel and Oliver Iron Mining Companies, and formerly assistant manager of the Minnesota Iron Company, is to locate permanently at Sault Ste. Marie, where he will devote himself to the examination of mineral lands.

Mr. C. W. Bailey, chief traffic manager of the Lancashire & Yorkshire Railway, of England, and Mr. O. Winder, assistant carriage superintendent of the same company, are now in the United States studying American methods. They will visit Pittsburg, Cleveland, Chicago and railroad centers in the West.

Dr. A. P. Coleman, of the School of Practical Science at Toronto, has returned from a summer's trip to Dawson, N. W. T. He thinks that so far as present methods are concerned the Yukon has seen its best days as a gold producer. This season's output may reach last year's, $23,000,000, but a lower figure is likely.

SOCIETIES AND TECHNICAL SCHOOLS.

Rossland School of Mines.—This school will probably be re-established during the coming winter.

Queen's University.—Two new buildings for the Science Department at Kingston, Ont., are being erected. A new building for the mining school is to cost $90,000, besides equipment.

INDUSTRIAL NOTES.

The Albion Iron Works Company, Limited, of Victoria, B. C., has arranged to operate the foundry and machine shops of the old British Columbia Iron Works, which have been closed for over 3 years.

J. C. Wilson & Company, of Glenora, Ont., have recently furnished "Little Giant" turbines to the Geo. Sisson pulp mill at Bourg Louis, Que., and to the town of Iroquois. The company has sold 25 of its turbines for export to Great Britain and European countries.

The Worthington branch of the International Pump Company, of New York City, has recently secured some fair-sized contracts for pumping equipments to be utilized in British India. The Jammu Water-Works are to be equipped with various Worthington machinery. The watering arrangements of the Barsoi and Radhikapur depots on the Bhar section of the Eastern Bengal State Railway will each be operated by Worthington type; horizontal, non-compound, duplex steam pumps. The Lahore Water-Works is also to be supplied with triple expansion pumping engines. These contracts were secured through James Simpson & Company, Limited, of Calcutta.

The Pacific Coast Portland Cement Company's projected plant, to be erected at Vancouver, B. C., will be operated entirely by electricity. At first it was intended to have a capacity of 500,000 bbls. of cement per annum, but since the plant is the only one about to be engaged in the manufacture of portland cement on the Pacific Coast, the promoters are said to be negotiating with a well-known export house, which, it is understood, is willing to guarantee to take yearly 500,000 bbls. of cement for the China and other Far Eastern trades, and the factory may be largely extended. The electrical portion of the contract will mean an expenditure of about $90,000, while the whole plant was primarily expected to cost some $400,000. Should the suggestion of a larger plant be carried out, these figures will have to be increased. In addition to the electrical machinery all the other equipments to be installed in the Vancouver plant will be purchased in the United States. J. Keith Fisher, of New York, who is largely interested in the enterprise, is in Europe perfecting some financial details relating to the project. The company has offices in New York City.

TRADE CATALOGUES.

Bulletin No. 112, issued by the Jenckes Machine Company, of Sherbrooke, Que., is entitled "Horizontal Tubular Boilers." This catalogue contains much information about boilers, tables and plans, directions for setting up and operating pumps; also a chapter on costs, on feeding boilers, besides other practical information.

The Hadfield's Steel Foundry Company, Limited, of Sheffield, Eng., issues a circular stating that it has exceptionally good experience in manufacturing the various classes of steel used about mines, collieries, mills, quarries, etc., for wheels and axles, pulleys, haulage rollers, stamp mill shoes and dies, crusher jaws and other parts, made of Hadfield's manganese steel. The company manufactures improved crushers, both roller, gyrating and reciprocating. Francis T. Peacock, of Montreal, Que., is Canadian agent of the company.

GENERAL MINING NEWS.

BRITISH COLUMBIA.

Boundary District.

R. W. Brock, of the Dominion Geological Survey, recently visited the bituminous coal-fields on the West Fork of the North Fork of Kettle River, 70 miles north of Grand Forks. Mr. Brock stated that the coal occurs in tertiary rocks in an exceptionally favorable formation, but whether in paying quantities or not depends upon prospecting and further development work. Thus far no real work has been done except at two points where the outcroppings are opened a few feet. The coal is of good quality. Col. Linsley, of Spokane, Wash., is reporting on the fields for the Granby smelter, which recently bonded a group of 15 coal claims from the locators, residents of Grand Forks.

Bodie.—This mine on Torodo Creek, near Midway, is shipping to the Greenwood Smelter. The ore is hauled to Midway in wagons and from there taken by train to the smelter. It is the intention of the Bodie Company to ship a carload of ore each week until winter, when this amount will be considerably increased. The mine is the property of the Bodie Mining Company. A tunnel has been run over 400 ft., crosscutting 2 fair-sized ledges; 2 shafts have been sunk about 70 ft. The ore carries gold and silver. W. G. Madison is superintendent.

Boundary Ore Shipments.—Shipments for the week ending September 28th, as reported, were as follows: Old Ironsides, 4,425; B. C. Mine, 810; Winnipeg, 60; Snowshoe, 60; Mother Lode, 1,408; No. 7 Mine, 35; King Solomon, 60; total tonnage for week, 6,858; total for year, 264,418, valued at $1,586,508.

British Columbia Copper Company.—What is called a phenomenal smelter record for a single blast furnace was established October 1st, when the Greenwood plant put through 484 tons. Of this amount 432 tons was ore and the balance 12% coke. The furnace was built with a nominal capacity of 225 tons per diem, but owing to the self-fluxing character of the ore the daily average comes nearer 390 tons. Paul Johnson is manager of the smelter department.

Buckhorn.—M. M. Walsh is superintendent of this mine on Copper Mountain, near Myers Creek. The tunnel being run to tap the ledge at the 300-ft. level is now in 730 ft. A 100-ft. shaft showed the ledge to be 30 ft. wide.

Carmi.—This group of claims near Beaverdell on Upper Kettle River is being developed by an English syndicate under the superintendency of R. Longly. Open cuts, at intervals of about 100 ft., have located the outcrop. The deepest shaft is down 110 ft. About 200 ft. of drifting has been done at the 100-ft. level. The machinery installed consists of a 60-H. P. boiler, a hoist, No. 5 Cameron sinking pump and a Rand drill. A Tremain mill, 2-stamp, arrived recently and will form a part of the concentrator plant, which is on the way. Shaft house, bunk house and ore bins have been built. Work stopped at the mine last spring, owing to the impossibility of shipping ore over the wagon road to Westbridge.

Dayton.—This claim, 4 miles north of Camp McKinney, has been bonded to a Mr. Davidson. It was located in 1899, and later bonded to a Greenwood syndicate that ran out of funds and dropped it. The ore body has been shown up by surface cuts for a distance of 500 ft. An incline shaft is down 50 ft.

Golden Crown Mines, Limited.—At a recent meeting, held a few days ago at Brandon, Man., it was decided to reopen the property, located 5 miles from Phoenix, adjoining the Winnipeg. The following directors were elected: Judge Cumberland, president; G. R. Caldwell, vice-president; Senator Kirchoffer, Andrew Kelly, Frederick Nation and J. B. Curran, of Brandon; William L. Parrish, of Winnipeg; C. E. L. Jarvis, of St. John, N. B., and W. A. Fuller, of Spokane. The Golden Crown has not been working for about a year, pending reorganization. It has about 2,500 ft. of underground work done, has shipped in the neighborhood of 2,500 tons of ore, and is equipped with compressor and other machinery.

Granby Consolidated Mining and Smelting Company.—In a recent interview S. H. C. Miner, president of the company, in a recent visit stated that the company is adopting the "caving" system, which hitherto has not been applied to copper mining except in Utah. By means of large open cuts the company can break down the ore and load it upon the cars with steam shovels, thereby obviating all timbering and pumping, and reducing to a minimum the costs. It is stated that the present capacity of the plant is to be increased to 2,000 tons daily. Two additional furnaces are to be built at Grand Forks, and also a converter.

Republic & Grand Forks Railway.—Nearly 1,000 men are reported at work on this line, 42 miles long. Ground was broken last August and the builders say that they will have the line in operation by January 1st. If the plans are carried out this will be the quickest railroad construction on record. The purpose of this road is to connect American mining camps in Washington with the Canadian smelting center.

Snowshoe Gold and Copper Company, Limited.—A. J. McMillan, managing director, of London, Eng., has been looking over the company's interests. Shipments from the open cuts at the Snowshoe Mine have started.

Cariboo District.

Consolidated Cariboo.—The final clean-up for the season was brought out in September. It was valued at $35,000 and the total output of the season is about $150,000. The output would have been larger, but for the light snowfall last winter and a consequently short water supply this summer. Excavating for the bed-rock flume is being pushed and it is hoped that the flume will be ready for piping on the bed-rock next spring. There are about 2,000 ft. of the bed-rock carrying from 70 to 80 or 100 ft. in depth of gravel that has not been touched. The old camp is being moved to the new site and operations will be carried on from an entirely new camp near the mouth of the pit. Water pipes are being laid all over the new camp. Mr. Hobson is manager.

Cassiar District.

Instructions were recently issued from Victoria, in consequence of the recent visit of Premier Dunsmuir to Atlin, requesting Gold Commissioner J. D. Graham to cancel certain water-power rights on various of Atlin creeks. On Willow Creek and other places work was much impeded all summer because earth washed away

by monitors up-stream was carried into the bed of the streams and made it difficult for miners working the creek by ordinary placer methods.

Consolidated Spruce Creek Placers Company, Limited.—This Seattle, Wash., company recently bought the interests of Capt. Martin on Spruce Creek, near Atlin, and since then the company has acquired 2½ miles of the creek, from the falls up, and about 600 acres of bench ground, most of which has been prospected and proved auriferous. By the acquirement of the creek leases ample dumping ground has been secured and it is understood that satisfactory arrangements have been made for water privileges.

De Lamare Syndicate.—Bed-rock was recently struck on this company's ground on Boulder Creek, but a short water supply has prevented the company from doing much work.

The Stevendyke Hydraulic Partnership, which had considerable interest in the property acquired by the Consolidated Company, has traded all its interest on Spruce Creek to the company, and they now become entirely distinct propositions, with no conflicting interests. Messrs. Frank Weir and D. Todd Lees control the Stevendyke and its consolidations on Pine Creek. W. M. Brook, of Atlin, is manager of the Consolidated Company and C. H. Blackmore is mining engineer. The company is securing a complete hydraulic plant, which will be shipped in during the winter.

Sunrise Hydraulic Company.—An order of the Provincial Secretary at Victoria shut off this company's water on Pine Creek. The order was issued September 14th, and seems to have been due to expert statements. The order caused considerable excitement at Atlin, as it stopped a lot of work on the creek. The order was subsequently modified.

Nanaimo District.

Extension.—At this colliery work has started to clean up the debris of the recent terrible explosion and open the mine again. It will be some time before the workings where the bodies of the victims lie can be opened.

Harewood.—This coal mine, which is being developed by the New Vancouver Coal Company, is to become a shipper. The railway spur has been completed and the mine connected with the shipping wharves. The railway runs along the banks of the Chase River.

Nelson District.

Canadian King.—This property, adjoining the Second Relief, has received a 3-drill steam-driven plant. The drills are 3½ in. This is intended to assist the management in pushing development.

Golden Nugget.—L. Brant is at work with a force of men on this group on Taylor Creek, a tributary of Woodberry Creek, near Kaslo. This property is owned by the Consolidated Copper Company, of Minneapolis. It is a gold-silver proposition, and shows some free gold. Geo. H. Seeley is secretary.

Hall Mining and Smelting Company.—This company's returns for the 4 weeks ending August 26th show that during this period there were shipped from the Silver King Mine 2,586 tons of ore, which returned an average value of 21.62 oz. silver and 4.75% copper.

Imperial Development Company.—The second payment of $19,000 on the Eva Group in Camborne Camp is reported paid by this syndicate, of Nelson, who hold the bond on the property.

London & Richelieu Mining and Smelting Company.—B. C. Riblet, of Nelson, who has the contract for the tramway for the 10,000-ft. tramway, has 25 men busy and expects to have the tramway finished by December 15th. The wagon road, extending about 9 miles up from Crawford Bay toward the mines, is a good one, and when the tramway is completed the ore will be conveyed to the end of the road, whence it will be hauled in sleighs to the landing. It is expected that an average output of 50 tons per day can be maintained. On the last ore shipped a smelter rate of almost $14 had to be paid, but the company has just closed a contract with the Trail Smelter to treat 15,000 tons at $7 per ton for freight and treatment on the ore landed at Crawford Bay.

Maple Leaf Mining Company.—This company is opening a group of claims on Forty-nine Creek, about 8 miles below Nelson. There is a 200 ft. tunnel on the property and an 80-ft. shaft, and arrangements are being made to install a 20-stamp mill.

Second Relief.—This mine at Erie has received a 5-drill water-driven compressor plant. The machines are 3¼-inch Rand drills and will be set up within a few weeks. The plant is being put in to expedite the taking out of ore for the stamp mill, which is now practically completed.

Silver King.—At this mine developments are said to be progressing favorably. On the 900-ft. level a tunnel is being run. From the 600 and 800-ft. levels ore is being shipped daily, and with the completion of the tunnel at the 900-ft. level the mine will be in shape to turn out considerably larger shipments.

North East Kootenay District.

Mica Discoveries.—The mica beds of the Big Bend have been worked all summer by the locators, Messrs. Hatch, McDougall, Deacon and Walter Dainard, of Golden, who have brought in a pack train of 16 horses loaded with over a ton of mica, secured from one of the claims. The deposit is about 3 miles from the Columbia River, and very near the point where the river cuts through the Selkirks. The claims are reported easy of access and the mica is said to be contained in two series of well defined quartz ledges in a mica schist country rock.

Triune.—The gross returns from the second of this season's shipments to the Trail Smelter were $5,593, of which $655 were gold values. Another 20-ton lot is ready for shipment.

North West Kootenay District.

Beatrice.—Frank Fullmer, of Ferguson, has secured a bond on his co-owner's interests in this mine at the head of Goat Creek. At present the property will be worked from the Fish Creek slope, but a long tunnel may be driven from which the ore will be rawhided down Goat Creek to Ferguson and then hauled to Trout Lake for water and rail shipment.

Duquesne Mining Company.—This company, of Pittsburg, Pa., now operating placer leases on Smith Creek in the Big Bend, has raised its capital from $400,000 to $1,000,000.

London & British Columbia Gold Fields, Limited.—This company recently threw up its bond on the Eva Group on Lexington Mountain, near Camborne. The bond was for the purchase of the property at $250,000. According to reports the company sought a large property on which it would be justified in expending £100,000, and which would give an ample ore supply for a mill containing 100 stamps. The Eva was not large enough.

Rossland District.

(From Our Special Correspondent.)

Rossland Miners' Strike.—The Le Roi, Le Roi No. 2, Rossland Great Western and Kootenay mining companies are advertising for men, offering the following wages: Machine miners, $3.50 per 8-hour day; timber men, $3.50 per 8-hour day; timber men helpers, $3 per 8-hour day; carmen, $2.50 per 8-hour day; shovellers, $2.50 per 8-hour day; surface laborers, $2.50 per 10-hour day; carpenters, $3.50 per 9-hour day; blacksmiths, $4 per 10-hour day; engineers, $3.50@$4.50 per day of 8 to 12 hours; firemen, $3 per day of 8 to 12 hours.

Mr. Henry Bratnober states that miners are arriving from the Coeur d'Alenes, that more are coming and that the strike is practically over so far as the Le Roi is concerned. The company is securing in Winnipeg laborers returning from the Manitoba harvest fields, who have been working for longer hours and lower wages than the company is offering and are expected to make good shovellers and trammers. Mr. Bratnober also says that the company will not discriminate against union men, but neither will it recognize the unions.

The reports sent out to provincial and Washington papers I think have been prepared by partisans of one side or the other. The following statement appeared in the Rossland "Miner." Mr. Frecheville and Mr. Bratnober assure me that it was given out with their approval:

Before the company took over its mining property the engineers reporting on it based their estimates for returns on the capital invested in the purchase price, on the output of the mines from the employees working 10 hours per day, the 10-hour day being that established in the United States for the preceding 50 years, and in the Province of British Columbia since quartz mining was commenced. The standard scale of wages in the Rossland camp never exceeded $3.50 per day for miners and $2.50 per day for muckers, except for shaft work.

Up to the time of the purchase of this property the government tax was 1% on the gross value of the output. This tax, however, was doubled at a later session of parliament.

Following the doubling of the government tax parliament enacted what is known as the Eight-Hour Law, which reduced the hours of labor from the standard of 10 hours per day to 8 hours per day, in consequence of which the output of the mine, per day's work, was reduced proportionately.

The companies operating in Rossland, however, including the Le Roi, continued to pay the miners the same wages for the 8-hour day that they formerly paid for the 10-hour day, making careful compilations of the extra cost entailed thereby.

The additional cost which the 8-hour system entailed for the same amount of ore produced by the 10-hour system, which was 285 tons per day, was found to equal $100,000 per annum in round figures.

Up to this time the carpenters at the mine worked 10 hours per day, for which they received $3.50. The Carpenters' Union then made a demand on the company that they should be given the same wages for a 9-hour day. This was conceded by the company.

Later the Miners' Union demanded that the companies abolish the contract system, and insisted that the standard scale of wages be paid for 8 hours spent in the mines, no matter what amount of work was done during this time.

This demand was also acquiesced in, with the result that during the period following the mine costs kept increasing enormously, until the probability of making any profits on the mining operations had disappeared.

The companies became alarmed and began to consider what could be done to make their mining operations profitable.

Two plans suggested themselves:

(1) A reduction of wages proportionate to the reduction of hours brought about by the Eight-Hour Law.

(2) The operation of the mine under the contract system.

The companies were opposed to the reduction of wages, and adopted the contract system, basing the estimates for contract work on the standard scale of wages.

It was then announced to the miners that the mines would be operated henceforth on the contract system as far as would be convenient to do so. This the Miners' Union opposed, and declared a strike.

After the mines were closed down 66 days (February 8th to April 16th, 1900) the Miners' Union agreed to accept the company's proposition and allowed its members to return to work.

From that time until July 12th, 1901, a period of over 14 months, the mines were operated under the contract system, the contractors making considerably more than the standard scale of wages and doing cheaper work for the company.

To assist in making the Le Roi Mine produce a reasonable return on the capital invested, it was found that there would have to be a much larger output from the mines and the capacity of the smelting plant correspondingly increased. To accomplish this, an expenditure of over $350,000 was made in the installation of mine machinery and the sinking of a 5-compartment shaft. At the same time the smelting capacity increased from an average of 300 tons to 1,500 tons per day. This was accomplished at the cost of approximately $200,000, making the total aggregate cost for machinery betterments about $550,000.

After this additional expenditure, made necessary by the operation of the Eight-Hour Law and the doubling of the government tax, the company expected that it would be in shape to realize suitable returns on the capital invested.

These additions to the mine and smelter were about completed when the Miners' Union made the following demands:

(a) That muckers' (carmen, shovelers and common labor) wages be increased from $2.50 to $3 per day.

(b) That the hours of labor for carpenters be reduced to 8 hours per day without any reduction of wages.

(c) That the hours of labor for blacksmiths and helpers be reduced 1 hour per day without any reduction in wages, at the same time demanding an increase of 50c. per day for the blacksmiths' helpers.

(d) That the secretary of the union be permitted free access to the company's property to solicit the membership of its employees.

(e) That the company concede the demands of the Northport Mill and Smeltermen's Union for the reinstatement of discharged men.

The strike was ordered before these demands were submitted to the manager.

The directors were chagrined at this unreasonable action of the Miners' Union. After full consideration of the conditions affecting the operations of the Le Roi Mine since its acquisition by the company, as set forth in the above resume, and in the interests of the shareholders, who have so far not received one cent of profit from their huge investment of capital, the directors have decided that they cannot accede to the demands of the union.

In view of the fact that the scale of wages offered, the conditions of life, accessibility and climate of this camp are equal, if not superior, to those of any other mining region in North America, the directors are confident that reasonable men will recognize the justice of their decision.

Joseph Calistro and Thomas M. Beamish, 2 members of the Miners' Union, were recently sentenced to 2 months' imprisonment in the provincial jail for assaulting and intimidating Joseph Horn, an employee of the Northport Smelter, on August 10th.

Cascade.—At this claim operations are progressing steadily. Steve Brailo, of Rossland, is in charge. An upraise is to be started off the tunnel on the 100-ft. level, to connect with the 76-ft. shaft which was sunk on the vein.

Keremeos Copper Mines, Limited.—This company is operating on the Beaconsfield, Gibraltar, Lady May, Centurion, Mameluke, Pontiac, Westward Ho and Lady Bertha, about 6 miles east of the Nickel Plate, at Rossland. A tunnel is in on the Beaconsfield 100 ft. to cut the ledges opened up on the Gibraltar, Lady May and Pontiac. The company has sunk 3 shafts and has ore from the grass roots. It is the intention of

the company to erect a smelter next spring. R. W. Northey is manager.

Rossland Ore Output.—The output of the mines is steadily increasing and the normal output of 10,000 tons per week seems in sight.

The output for the week ending October 5th and for the year to date is as follows:

	Week.	Year.
Le Roi	2,450	114,038
Le Roi No. 2	620	25,520
Centre Star	.....	54,648
War Eagle	.....	20,100
Rossland G. W.	.....	8,436
Iron Mask	.....	3,733
Homestake	.....	20
I. X. L.	.....	230
Spitzee	.....	160
Velvet	.....	563
Monte Cristo	.....	20
Evening Star	.....	74
Giant	.....	52
Portland	.....	24
Totals	3,070	227,768

Since the Josie resumed work the shipments by weeks have been as follows:

September 7th	1,520
September 14th	1,650
Sep tember 21st	1,740
September 28th	2,480
October 5th	3,070

Big Four.—Work is going ahead on the usual lines.

I. X. L.—Work was to be resumed on October 15th under Roy H. Clarke, superintendent. Operations will be continued all winter. The 4th, or lower level, in the mine will be extended to tap certain ore bodies and an upraise will start at the end of the 400-ft. level and run up to the 350-ft. level to develop the ore body lying between the tunnels. In addition, prospecting cross-cuts will be driven from the 200-ft. levels. Stoping will start immediately, and the mine will soon ship ore.

O. K.—The work at the mine is confined to prospecting in the old workings. A small crew is employed.

Spitzee.—Work is progressing steadily. The west drift from the 100 ft. is in solid ore its entire distance.

Tammany Group.—W. E. Pickering represents the Duluth, Minn., interests controlling this group in Burnt Basin, near Rossland. Work is suspended and the matter of resumption is in abeyance. The syndicate worked on the property for upwards of 3 months.

Slocan District.

Slocan Ore Shipments.—According to the New Denver "Ledge," the shipments from Slocan mines were as follows for the week ending September 28th:

	Week.	Total.
Payne	...	1,696
Last Chance	20	1,119
Slocan Star	126	2,594
Ruth	...	279
Bosun	20	340
Hewett	130	1,543
American Boy	42	1,270
Ivanhoe	20	997
Trade Dollar	...	160
Sunset (Jackson Basin)	...	380
Sovereign	...	117
Wonderful	...	44
Arlington	140	3,170
Two Friends	...	40
Enterprise	20	460
Hartney	...	140
Black Prince	...	125
Goodenough.	...	215
Miller Creek	...	20
Reco	...	165
Sunset (Canadian Gold-fields)	...	53
Silver King	...	14
Noble Five	...	59
Red Fox	...	103
Antoine	...	18
Queen Bess	...	1,154
Monitor	...	345
Corinth	...	81
Bondholder	...	28
Rambler	...	968
Surprise	...	20
Kaslo Group	...	10
Chapleau	...	15
Speculator	...	10
Ajax	...	10
Soho	...	39
Emily Edith	...	40
Phoenix	...	3
Alpha	...	40
V. & M.	...	20
Marion	...	22
Ruby	...	1
Esmeralda	...	6
Hampton	..	2
Capella	...	22
Fourth of July	...	7
Tamarac	...	5
Total tons	518	18,000

For the week ending October 5th the shipments were: Payne, 47 tons; Slocan Star, 53; Hewett, 100; American Boy, 20; Sunset, 20; Arlington, 210; Enterprise, 20; Queen (for September), 45; Monitor (for September), 135; Rambler, 40 tons. Total for week, 690; total for year to date, 18,738 tons.

American Boy.—At this mine, near Sandon, 40 men are now busy.

Enterprise.—The force at this mine is being increased. A new vein 12 ft. wide, parallel to the old one, is being opened. It is of lower grade. Twelve baby drills are to be installed. The concentrator is ready to start.

Hewett.—This mine on Four-Mile Creek is now one of the largest shippers in the district. It has 60 men on its pay roll.

Monitor.—This mine has 2,000 tons of ore ready for shipment. Development work is being pushed steadily forward, and when the rawhiding season opens the property will be in position to make heavy shipments.

Mountain Consolidated.—This property, near Sandon, is owned by W. W. Warner, who is opening an 18-in. shoot of galena. An English company spent $20,000 on the property without result.

Noble Five.—This mine is taking its old place among the big properties at Sandon. The recent strike of 10 in. of ore in the long tunnel, giving a vertical depth of 1,000 ft., is of great importance. Another strike made recently has uncovered what is believed to be the large vein of the Surprise, that crosses over the summit. Numerous surface cuts have been made and the ledge encountered in each, carrying a shoot of high-grade ore.

Peerless.—This group of 4 claims, adjoining the Republic, near Slocan City, and owned by M. Isaacson, H. B. and W. E. Boie, have been bonded to Charles Dempster, who represents Detroit capital. The deal is for $8,000, payable in November.

South East Kootenay District.

Aurora.—At this claim on the lake shore directly opposite Moyie a shoot of galena 7 ft. wide is reported cut. The main tunnel is in 300 ft.

Crow's Nest Coal-fields.—John Turiff, Dominion Lands Commissioner; Wm. Pearce, Inspector of Dominion surveys, and Col. Taylor, of the Pittsburg Coal Company, Pittsburg, Pa., recently inspected these coal-fields. They were sent there by the Minister of the Interior to look at and report on the coal lands provisionally selected by officials of the department to make up the 50,000 acres which the Government is to receive as its portion of these lands. Col. Taylor is chief engineer of the Pittsburg Coal Company, and was selected by Mr. Sifton to report upon the proposed locations. The richness of the coal and the depth of the seam have not only to be considered, but also accessibility to the mine, which is perhaps one of the most important matters.

The work on the shaft on the placer ground at Perry Creek, near Camborne, is going ahead, and in a week recently the clean-up averaged over $18 to the man. The force in the shaft has been reduced, as a number of men are getting everything in shape for winter. When this is done 3 shifts will be put on, and the work pushed during the winter. The pay dirt is showing up well.

Yale District.

Fraser River Gold Dredging Company.—This company's dredge at Lytton is ready. Manager H. Graham had hoped to start it sooner, but owing to the delay in the arrival of machinery could not. Some new buckets have replaced old. The gold saving tables and washing appliances have undergone extensive changes and repairs. Mr. Graham has with him 1 or 2 experienced New Zealand dredger men.

Vermilion Forks Mining and Development Company.—This company recently ordered of the Rand Drill Company, of New York City, a Davis calyx drill and is about to begin prospecting its coal lands on the Similkameen. The outfit includes a class F drill, for drilling a 3¼-in. hole 300 ft.; a 7-H. P. vertical engine, an 8-H. P. horizontal locomotive boiler, pumps, hose and necessary fixtures. The outfit has a total weight of 6,300 lbs., and is mounted on two wagon trucks. An expert driller from Idaho will superintend boring operations. Arthur Hickling, of Princeton, is managing director of the company.

West Coast of Vancouver Island.

Henry Croft, of Vancouver, has bonded to a United States syndicate a group of claims on Mount Richards, 6 miles from the Lenora Mine. The price is not stated, but the syndicate agree to spend $25,000 on the property during the life of the bond.

Tyee Copper Company.—This company has made its first shipment of 200 tons of ore from its mines at Mt. Sicker to the Tacoma Smelter, via Somerset.

LABRADOR.

Dominion Development Company.—This Ottawa company has been prospecting for minerals in Labrador. Recently it made an important discovery of iron ore deposits on an island not far from Hopewell in the Hudson Straits. The company is comprised of English, American and Canadian men and has large resources.

NORTHWEST TERRITORY.

Yukon District.

Dr. Robertson, British Yukon inspector of mines, has made the following statements regarding the present condition and the future of mining about Dawson: "My opinion as to the life and gold-producing possibilities of the Klondike is based on a thorough inspection and study of the mining conditions. Improved methods of mining, cheaper transportation, cheaper labor and many other things are contributing to increase the production of gold, and rendering the effort to get it more profitable. It has been demonstrated that the dredge can be successfully operated in the Klondike. When I left the district they were working a dredge on No. 42 below on Bonanza. The claim could not be worked successfully from a financial standpoint by the usual placer method, but the dredge is giving good returns. The output will continue large. There will be no perceptible decrease in the yield for 10 years. I expect to see great things accomplished by steam shovel and hydraulic operation. The latter, of course, requires a lot of water, the supply of which, when exhausted in the creeks, I think will be the Klondike River. There is now one steam shovel in successful operation on Lower Dominion, and Dominion is a great creek.

"The reduction of the royalty from 10% to 5%, with an exemption of $5,000, has been a material factor in bringing about an increase in the annual output, and within a twelvemonth I look to see the royalty abolished altogether and an export duty of 2% substituted. This will force the establishment of an assay office in Dawson.

"In considering the yield of the Klondike since its discovery 5 years ago, one naturally begins to speculate on the life of the camp and say it will soon peter out. Eldorado Creek has been developed up to claim No. 40. There is but little ground in that distance that has not been washed in some shape. But all of this creek will be rewashed. Even the tailings will be gone over again and hydraulic work will produce a vast amount of gold from the 35 to 40 claims that now appear to be worthless. The placer mines on this creek long ago successfully used small force pumps and also pulsometer pumps, for cutting down the frozen gravel instead of using steam points for thawing.

"Bonanza Creek, which, when finally worked out, will probably have produced as much gold as the celebrated Eldorado, is not now more than 1/3 worked out. Many of the smaller creeks of the district, regarded as worthless from the standpoint of the primitive placer method of development, are paying well where machinery is employed. Very little, in comparison with what there is open for development, of the hillsides and benches has been worked. This season good strikes have been made on Montana and Montreal Creeks, tributaries of Indian River, which is practically part of the Klondike District. These and many other unworked streams will doubtless demonstrate that they carry good pay ground."

Klondyke Consols.—The output from August 28th to September 10th is given as follows: El Dorado 401 oz.; Bonanza, 692 oz.; Hunker, 97 oz.; total, 1,190 oz., of value of £3,925. At the average rate of working expenses (29%), this shows a profit of £2,787 for 12 days working.

Klondike Gold Shipments.—Gold shipments from Dawson for the 3 months of summer reached the total of $18,543,000. The shipments by months, according to the Gold Commissioner's statement, were as follows: June, $5,918,000; July, $9,625,000; August, $3,000,000; total, $18,543,000.

The above represents the bulk of the season's gold output, though shipments yet to come may raise the total by several million dollars. No doubt, too, there is gold got to a considerable, though reduced extent, which fails to enter the official returns. Hence it is quite likely that the Yukon gold output of the year will in reality reach about $25,000,000, though several millions less may be recorded.

Quartz Mining.—George M. Munger, of Chicago, Ill., has installed a small Tremaine mill, which he is using to test ore from various ledges located by his local representative, Capt. Spencer.

NOVA SCOTIA.

Cape Breton.

Nova Scotia Steel and Coal Company.—This company, whose steel works are at Trenton and coal works at Sydney Mines, is paying considerable attention to the development of its coal areas in Cape Breton. Hiram Donkin, late resident manager of the Dominion Coal Company, is now in the employ of the Nova Scotia Steel and Coal Company, and is preparing plans and specifications for the construction of a large shipping pier at North Sydney. It will be 67 ft. high and 500 ft. long. It is to be equipped with apparatus of the latest design for the handling of coal; 600,000 tons, it is predicted, will be the company's output next year.

Halifax County.

Baltimore-Nova Scotia Gold Mining Company.—This company, successors to the Guffey-Jennings Company, at Caribou, is installing a large air compressor and drill. Development work may be continued on a larger scale than ever under the general superintendence of L. W. Getchell. The treasurer of the company is A. S. Dunham, of Boston.

ONTARIO.

Addington County.

Feldspar Mining.—H. Richardson has decided to run his feldspar mines at Verona until Christmas. The feldspar at Verona mines is called the finest in the world, but the demand is not great. About 7,000 tons would be sufficient for the whole United States for one year. At present feldspar is used for putting an outer coating on porcelain mantels and for enamelling baths, door knobs, etc. It costs about $1.25 per ton to bring the rock to Kingston.

Algoma District.

Bruce Mines & Algoma Railway.—This company has organized, electing the following officers: President, John McKay, Sault Ste. Marie, Ont.; vice-president, Sol. Skall, Cleveland, O.; general manager, Arthur S. Burrows, Bruce Mines; treasurer, Herman Wile, Buffalo, N. Y.; secretary, I. C. Holden, Sault Ste. Marie, Mich. The contract for track construction was awarded to Birmingham & McMartin. The road will extend from Bruce Mines to Rock Lake.

Ontario & Colorado Gold and Copper Company.—This company, which is controlled by A. P. McInnes and other Detroit men, has begun work on its property in the Township of Copper. J. M. Eggert, of Toronto, is in charge of development.

Hastings County.

Belmont.—This gold mine, near Madoc, is shipping bullion regularly. Manager Kerr, of the Belmont Gold Mine, was in town a few minutes on Friday. He has just returned from a visit to England to lay before the directors of his company the question of developing the water power owned by the company, as well as other matters. Everybody interested in this great mine will be glad to hear that Mr. Kerr has already put men to work to complete the work at the dam. An immense air compressor will be installed at the dam and compressed air will be conveyed to the mine in iron pipes. This will furnish abundant power for all operations in connection with the mine and mill, and will certainly make the Belmont a unique mine in Canada for working on a large scale most economically in every detail. One of the consulting engineers of the company from London, England, is here giving his assistance in the matter.

Canadian Gold-fields.—This company continues to ship regularly gold bullion and arsenic from its plant near Deloro.

Lake of the Woods District.

British-Ontario Gold Company, Limited.—This company has been floated in London, Eng., by Col. J. S. Hillyer, formerly of Duluth, Minn., and has leased the Alice A. Mine for 99 years. The company agrees to mine 200 tons of ore daily. The directors are: Edward Coventry, London; Capt. R. B. Needham, Sussex; Col. W. S. Engledue, Tunbridge Wells; Col. F. McDonald, Surrey. The company's bankers are Messrs. Robarts, Lubbock & Company, London. The capital is £300,000.

(From Our Special Correspondent.)

Anglo-Canadian Company.—Recent arrivals from Sturgeon Lake, northeast of Ignace, report that the results of prospecting during the summer are very encouraging. A contract for shaft sinking has been let.

Elizabeth.—Work is proceeding steadily at this company's property near Harold Lake, about 2 miles from the line of the Canadian Northern Railway. One shaft is down over 200 ft. and another is down over 100 ft. Preparations are under way for a mile.

Flint Lake.—The company running this property, the option on which has been taken up, intends to put up money to start work shortly, and will put in a steam hoist this winter. Mr. Newton Highbee, of Rat Portage, is manager of this mine and the Golden Eagle.

Golden Eagle.—At this mine the shaft on the new vein is down 35 ft., the vein being about 2½ ft. wide, with considerable visible gold. It is understood that the company has decided to carry on work during the winter, necessitating putting in a steam hoist.

Golden Horn.—The new shaft house is completed and all the hoisting machinery is in place.

Ohio & Michigan Mining Company.—Capt. Proudlock has taken a contract to sink a shaft 100 ft. for this company on the property on Salestick Bay, about 45 miles from Rat Portage, and has gone out with a gang of men. The shaft will be about 1½ miles from the shore of Lake of the Woods. The price for sinking is $28 per ft. A horse whim will be used.

Mikado.—On the 7th inst. Manager McMillan brought in to Rat Portage 405 oz. of bullion, the result of 12 days' run of the 20-stamp mill. It is said that the cost of mining and milling at this mine is now about $2.70 per ton.

Scramble.—The caretaker has received instructions to have the mine unwatered at once. The presumption is that an expert is to examine the property.

Wendigo.—This gold mine was examined by John Hardmann recently, for whom has not transpired.

Michipicoten District.

Helen.—This iron mine will be operated all winter. About 550 men are at present employed and about 400 will be retained through the winter.

The village near the mine is rapidly growing; several new buildings have been erected, among them an assay office. Mr. Little is superintendent.

Sudbury District.

(From Our Special Correspondent.)

Canadian Copper Company.—The mining operations of this company have been greatly enlarged during the year, and the daily output of 6 mines is now over 1,200 tons. About 1,500 men are employed in the mines and smelting works, and the pay-roll is almost $30,000 a month.

Great Lakes Copper Company.—This company still hangs fire, and only employs 2 bookkeepers, an assayer, and 3 or 4 men. The company has one very good nickel mine near Sudbury in a fairly well-developed state, but is said to have difficulty in raising money to work it. The local manager lately left the company, and is now with the Lake Superior Power Company as captain of the Elsie Mine, which was purchased by the latter company a few weeks ago for $100,000. The Murray Mine, after lying idle 5 years, has been pumped out, and from 20 to 30 men are now getting out ore.

Hamilton.—This copper mine is being developed on a practical scale by Thomas Nevens, of Orange, N. J., and others, who seem satisfied with results. The property is located off the nickel belt in the Cambro-Silurian formation of the Chelmsford Valley, some 15 miles west of Sudbury, near the so-called coal beds there.

Mond Nickel Company.—This company's smelting plant, after several delays, is now running very well, but as the company is only working one mine, some of the furnaces are idle from lack of ore. The scarcity of miners is another difficulty, and from 500 to 1,000 additional men could find ready employment in the nickel mines alone. Good miners are paid from $1.75 to $2 a day, while board costs $3.50 a week at the mines. All the companies pay in cash on the 15th of every month. House rent is also low.

Nickel-Copper Company.—This company had some men developing a nickel property near Worthington Station for more than a year, but all work recently stopped. The new process smelting plant, erected by John D. McDonald, has proved a failure.

Orford Copper Company.—The company is getting out some fine ore from its copper mine near Massey station, about 70 miles southwest of Sudbury, and the property gives promise of making a valuable mine. The ore is shipped to the company's smelting works at Copper Cliff, and a 4-mile spur of the Canadian Pacific is being built to the mine.

Renfrew County.

The smaller of the two Government diamond drills, which has been working since the beginning of July at the Golden Star Mine, has completed operations there, and is being sent to an iron property near Eganville, where it will be employed by the Canada Furnace Company to explore its deposit there.

MINING STOCKS.

(Full quotations of the Toronto and Montreal Exchanges will be found on pages 512, 513.)

Montreal. Oct. 14.

(From Our Special Correspondent.)

Our market is suffering from the absence of investment orders. We had hoped the readjustment of affairs of certain British corporations handling our mines would revive confidence and prove beneficial to the stock market, but as yet the improvement has not been felt. Perhaps the labor troubles in the Rossland District have made investors apprehensive. This is not surprising, as the earnings on stocks in recent years have not been as satisfactory as holders anticipated. Of 18 dividend-paying mines with an issued capital of $29,988,045, comparatively few are dividing profits to-day. The disbursements since organization aggregate $5,771,337, which is equal to a little over 19% on the capital invested. Undoubtedly the best paying mines were the silver-lead, which returned 55% of the capital invested by their stockholders, having paid in dividends a total of $3,222,250. The share capital of these companies ranges from $250,000 to $2,600,000, which has been subscribed principally by Canadian residents. The gold mines, on the other hand, are controlled largely abroad. These properties have to their credit dividends amounting to $2,329,087, which is a return of 22% on their capitalization. One copper-silver property paid $220,000, or 16% on its capital stock. It is worthy of note that 7 of the mines promoted in the British market with an issued share-capital of $7,638,045, have paid dividends to the amount of $1,923,500, or 25%. The gold mines yielded the greater part of these dividends.

The market value of the dividend-paying stocks has been greatly impaired lately, owing to the fluctuating earnings of the properties. In a number of cases dividends have not been paid in over two years, and, judging from present operations, another declaration need not be looked for in the near future.

At the head of the dividend list is Payne Consolidated, a silver-lead property with $1,438,000 to its credit, which is equal to over 55% on the capital. At the payment of the last dividend this property had a market value of about $1,900,000, but to-day it is quoted at $520,000, showing a fall of 73% in less than a year. Le Roi is another prominent mine, and one which has attracted wide attention owing to the unsatisfactory management of its parent company in London. This gold mine has yielded $1,305,000 in dividends, but of this amount only $250,000 was paid to the holders of the present $5,000,000 stock, the balance having been paid by the old Le Roi company. The British Le Roi shares are not dealt in here, as they are listed on the London Exchange, where latest quotations were equivalent to $35.82. Le Roi No. 2, a close neighbor of Le Roi, has paid $144,000, or 4.8% on a $3,000,000 capital, and at present market quotations the property is worth $1,965,600.

Another leading gold property is Ymir, in which British capital is also heavily interested. On a $1,000,000 capital the company has paid $192,000 in dividends. The stock is selling above par on the London Exchange, and at latest quotation the property is marketable at $2,004,000.

War Eagle, which at one time was a regular dividend-payer, suffers heavy declines in price. Sales of the stock have been made around 12c., placing the market value of the property at $141,000. This is rather discouraging for a mine that has yielded stockholders $545,250.

Cariboo-McKinney is one of the few active dividend stocks. Since its incorporation it has paid $478,087, or over 38% on a capital of $1,250,000. There are not many sales of the stock, though in the past month prices have fluctuated between 29c. and 16c., closing at the higher figure.

Since August, a year ago, when Reco paid a 10c. dividend, the stock has not been traded in regularly. It has a dividend record of $287,500, equal to nearly 29% on the capital stock.

North Star appears regularly every quarter with a 3c. dividend, and though sales are being made, stockholders are satisfied with their investment. Consequently the quotation has advanced from 25c. to 40c. since my last letter. On an outstanding share-capital of $1,300,000 the company has paid $237,000, or a little over 18%.

The Center Star gold mine is too heavily capitalized to yield large dividends. Though it has paid to date $175,000, this amount is equivalent to only 5% on the capital subscribed. However, the stock market is strong, and prices have risen to 51½c. from 36½c. a month ago; but sales are small.

Rambler-Caribou, a silver-lead mine that has paid $130,000, or over 10% on its capital, fluctuated systematically on the stock market. From 44c. it rose to 50c., but later receded to 40c., although few sellers were visible. St. Eugene is another heavily stocked silver-lead mine, but little is heard of the shares on 'Change. Since incorporation the company has paid 6%, or $210,000. Other properties that have yielded 5% and less on a capital stock of $200,000 to $550,000, are Athabasca, $25,000; Queen Bess, $25,000; Bosun, $12,500; and Fern, $10,000.

The Idaho silver-lead mine has made a very good showing, paying in dividends $292,000, or over 58% on its capital. Practically no stock is obtainable in the open market.

Another stock whose holders are not "feeding" the speculative market is Last Chance. This silver-lead mine has a $500,000 capital, upon which it has paid 9%, or $45,000, in dividends. Dividends were discontinued in 1899, when so many mining enterprises in British Columbia met with misfortune.

The Hall property, producing copper and silver, is credited with dividends aggregating $220,000, all of which went to the old stockholders. As yet nothing has been paid by the reconstructed company, in which British capital has a controlling interest. The present selling price in London is equivalent to $1.80 per $5 share, placing the market value of the property at $585,000, which compares with an authorized capital of $1,625,000.

Sales of Virtue have been made around 15c., while at the close the stock is strong at 20c.

Noble Five was marketed at 11@8c., but buying is only moderate.

Deer Trail and Golden Star, two of the cheap stocks, received the usual attention, both selling better than the other shares.

The remainder of the list was featureless, and, though quotations were made by brokers, little buying interest was shown.

The close of the market is materially better than the opening, and there is hope of a general improvement soon.